

Going Abroad: US Legacy Carriers' Shift to International Operations

by

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Submitted to the Department of Aeronautics and Astronautics
in partial fulfillment of the requirements for the degree of

Master of Science in Aeronautics and Astronautics

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

[June 2008]

May 2008

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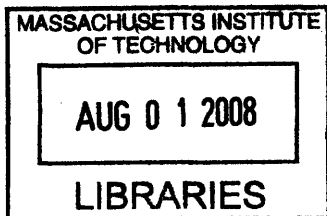
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Abstract

In the recent few years, there has been an observed trend of US legacy carriers putting more emphasis on international traffic than domestic, i.e. expanding international capacity while decreasing their domestic capacity. It is generally understood that the reason for doing so is due to the lower level of competition in international markets. Compared with the highly deregulated domestic market, legacy carriers face less competition in international markets especially from low cost carriers, and thus should be able to generate a higher yield.

The goal of this thesis is to examine how the operational strategies for legacy carriers have changed and how different factors affected the changes. More specifically, the evolution of operations of legacy carriers in different regions of the world from 1995 to 2006 was analyzed in order to understand quantitatively how these strategies evolved through time, the driving force behind the change, and the results of the changes. We looked at the relative traffic and capacity volumes in different regions, and compared the costs, revenues and profitability among them.

This study showed that between 2003 and 2006, legacy carriers increased international capacity by 26% while decreasing domestic capacity by 5%, thereby increasing their proportion of international capacity from 30% to 36%. Two measures were found to be a good explanatory variable for this shift. This first was the relative change of profitability between domestic and international operations as derived from the change in gap between domestic and international unit cost (Ex Transport Related & Fuel) and the change in gap between domestic and international passenger unit revenue between 2000 and 2003, whereby the international profitability improved relative to domestic profitability in the period. The other was the yield premium that international operations have over domestic markets after average stage length was adjusted for. Both of these factors created the setting for US legacy carriers to aggressively shift operations internationally.

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Acknowledgements

First and foremost, I would like to thank my research advisor Dr. Peter Belobaba for giving me the opportunity to work on this project, and for hiring me as a research assistant. I am very thankful for his patience, support and guidance along the way. His vast knowledge of the airline industry was of great insight to me and prepares me well for my future career in the airlines that is about to start.

Thanks must also be given to William Swelbar, who together with Dr. Peter Belobaba, came out with the idea for the topic of this thesis, and whose Airline Data Project provided a solid foundation for my research to build upon.

Of course I must also thank my ICAT lab mates who have balanced my work life with the many conversations, lunches or free food hunts we have had, in addition to assisting me with various aspects of my research. They include my colleagues Fabian, Charles, Emmanuel, Wilson, Matt, Nikolas, Alex, Claire, as well as Norma, Emilio, Hanbong, Lishuai, Ioannis and Megan. They have all made life much more enjoyable at work.

In addition, I would like to show my heartfelt appreciation to all my fabulous friends here, in particular those in the Cantonese community, HKSS, HKSBS as well as friends in Sidney-Pacific for all the good times we have shared, and for all the help and support given to me during my stay in the USA. You guys have all contributed directly or indirectly to the successful completion of my degree.

Above all, I would also like to express my deep gratitude towards my loving family. I am really grateful for the great education and wonderful home that my parents provided; for the practical and emotional support my sister gave amid the crisis and challenges I faced these years; for the help with countless things (including college and job applications) that my extended family, uncles and aunts gave me. Special mention must be given to my cousin Adrienne, who also studies at MIT, for dining with me all the time and driving me all over the place.

Though my grandma won't understand a single word in this thesis, I would still like to dedicate this thesis to her. I want to thank her for thinking about me all the time. I am sorry for not being with her at home the past two years while studying here. I know she was unhappy about that, but I am sure she would be happy to see what came out of this wonderful education at MIT.

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Chapter 1

Introduction

The goal of this thesis is to examine the extent of US Legacy carriers' shift towards a higher proportion of international operations, and to compare the different regions of operations in terms of volume, cost, revenue and profitability so as to explain this shift. In this chapter, an overview of the US airline industry is first given in Section 1.1. After that, Section 1.2 talks about recent trends in the industry that led to our selection of thesis topic, while Section 1.3 outlines the objective and structure of this thesis.

1.1 Overview of the US Airline Industry

The airline industry in the USA is one of the largest and most competitive in the world. US carriers transported 36% of the total number of passengers and performed 46% of the total number of flights worldwide in 2005. In the same year, six out of the world's top ten airlines in terms of Revenue Passenger Miles were US carriers [1].

Before airline deregulation in 1978, the US airline industry was highly regulated, whereby the Civil Aviation Board granted rights for airlines to serve specific routes, limited the number of carriers serving each market, and set corresponding fares for each flight using a mileage based formula that guaranteed profit margins [2].

When the Airline Deregulation Act was signed in 1978, US domestic market was abruptly freed from most regulatory constraints on pricing, entry and exit [3], meaning that companies are free to enter the industry, while airlines are generally free to set their own pricing and to fly any route they desire. The results of deregulation include a much expanded traffic volume, which doubled in the first 10 years of deregulation (a growth rate well above the pre-deregulation times) [1]; a highly competitive market place, with the average number of competitors increasing from 2.2 per market in 1980 to 3.5 in 2005 [3]; as well as lower ticket prices, in which the median fare in real terms declined almost 40% since from 1980 to 2005 as measured in 2005 dollars [3]. Airline deregulation also led to the growth of hub-and-spoke operations seen today, where most major airlines now have one or more hubs at which many of their long distance passengers change planes [3]. But on the other hand, this industry is not a particularly profitable one. According to the Air Transport Association, deregulated US airline industry had never posted a net profit margin higher than that of the average U.S. Corporation, and from 1997 to 1999, one of the best years in the industry, the net profit margin was only around 4.4%. [4]

In the competitive landscape, major airlines in the USA are commonly indentified into 2 main groups: Legacy and Low-cost Carriers. Legacy carriers, also referred to as network carriers, are basically the long established airlines that operate a hub network, and usually conceived to have a higher level of passenger service (though cost cutting in recent years have made this statement questionable). LCCs, or sometimes called Low Fare Carriers, on the other hand typically focus on giving customers low ticket prices by have better operating efficiency and lower frills. LCCs have enjoyed steady growth since deregulation, and by 2003 had already taken up one quarter of the domestic market share [5], posing a huge threat to legacy carriers.

The threat of LCCs is exacerbated by industry's extensive use of information technology, with nearly 40% of the tickets being purchased online by 2004 compared with just around 10% in 2000 [6]. The effect of online sales is the explosive increase in transparency of airline fares, whereby passengers can easily compare prices from different sources, making airlines easier to promote low fares, and in turn creating an environment of stiff low fare competition.

One unique phenomenon in the US airline industry is the private companies' use of Chapter 11 Bankruptcy protection to help restructuring. Unlike airlines in other

countries, when US carriers face financial distress, instead of liquidating or closing down, they can file for bankruptcy protection, in which with the help of the legal system, they can renegotiate favorable terms and contracts with unions and other stakeholders. This has kept a lot of legacy carriers surviving through the years. A majority of legacy carriers filed for bankruptcy protection after 2001 for restructuring [2].

1.2 Recent Trends in the US Airline Industry

1.2.1 Recovery

The severe economic downturn starting in 2000, compounded by the terrorist attacks in 2001 as well as other factors like the war in the Middle-East and the SARS epidemic had put the US airline industry into turmoil at the turn of the century. US carriers reported a cumulative net loss of over \$40 billion between 2001 and 2005 according to the Air Transport Association [7]. Most of the largest US carriers, including Delta, Northwest, United and US Airways, sought Chapter 11 bankruptcy protection during this period while American Airlines and Continental Airlines undertook major restructuring efforts [2]. Dramatic capacity reductions were made across most of these carriers in order for them to stay alive [8].

However, changes have occurred in recent years and some positive signs are showing in the US airline industry. All of the legacy carriers that filed for bankruptcy protection have emerged from bankruptcy, and their bankruptcy actions have enabled significant restructuring in terms of wages, leaves and pensions [1], as well as substantial increase in employee productivity [9]. These airlines now have a much lower cost structure, giving them a much healthier shape to compete in the tough market.

In addition to that, the recovery of the economy after 2003 has improved the demand for air travel. Together with the legacy carriers' significantly trimmed capacity, which is 12% lower in 2003 compared with 2000, gives the airlines a much better yield. Major carriers have thus been back on track for profit since 2006, and according to Federal Aviation Administration, the US airline industry posted a \$5.8 billion net profit in 2007, the highest since 2000 [10].

1.2.2 Challenges

However, the US airline industry is still not without its challenges. The most frequently talked about threat to the airline industry these days is the high oil price. In the past few years, crude oil price had been hiking up unexpectedly, reaching over \$100 USD a barrel in Jan 2008, stark contrast to the price of around \$50 to \$75 in 2006, and an even higher contrast to the \$15 to \$30 a barrel that the airlines enjoyed in the late 90s [9]. This caused the jet fuel cost, which is highly correlated to crude oil price, to sky-rocket. According to the Energy Department's Energy Information Administration, jet fuel price tracked at \$3.17 per gallon in March 2008, which is double of what was in the beginning of 2007 [11]. Already in September 2007, fuel made up 27% of the operating expenses for US airlines according to the Bureau of Transportation Statistics, outpacing labor as the biggest portion of airline expense [11]. In fact, a number of major airlines, including American Airlines, Delta Airlines, United Airlines and US Airways, posted a loss for the fourth quarter in 2007, and they have mainly attributed this loss to the rise in fuel prices [12].

Legacies are facing also more and more competition from LCCs as the LCCs take up higher and higher market share. LCC capacity share has reached over 25% of total domestic capacity in 2005 [13], and an even higher proportion of 35% in the trans-continental market [14]. This has forced enormous pressure on the legacy carriers revenue stream, as studies have shown that the entry of LCCs in a market resulted in a 31.3% decline in average fare from 2000 to 2004 [2], while other studies showed that a low cost entry into a hub market can greatly reduce revenues of a legacy carrier [15]. As internet sales get more and more accessible, and, as more and more markets are exposed to LCC competition, the ability for legacy carriers to charge a yield premium over LCC diminishes. Studies have shown that the yield between legacy carriers and LCCs has converged from 1999 to 2004.

On top of these challenges, the US domestic market is also overly saturated, and there are not many markets that airlines can economically expand into [16]. Even for LCCs where the business model relies heavily on growth to keep operating cost down, the airlines are having trouble finding room to expand. Recent announcements of Southwest and JetBlue's plan to slow down the growth rate clearly show this trouble. Southwest deferred the delivery of 15 Boeing 737 from 2007 to beyond 2008 [17], while JetBlue

deferred 12 Airbus A320 deliveries in 2006 by up to 4 years, in addition to selling 5 of their existing A320s [18].

1.2.3 Response of Legacy Carriers

In response to these challenges, legacies have been adapting their strategies in order to maximize profitability, or, to minimize loss. To counter the lower yields, a lot of legacy carriers have outsourced more domestic capacity to regional partners while trimming their mainline capacity in recent years [9]. Regional carriers typically have a lower cost structure because of the much lower employee pay scales in relation to their mainline counterpart. The aggressive growth rate starting in 2002 with the relaxation of labor scope restrictions that allowed more Regional jets fly at the big six network carriers also helped keep their cost low [19].

Another major trend happening with legacy carriers is the shift of emphasis to international operations, i.e. to shift capacity from domestic flying to international flying. Legacy carriers took various degrees of increase in international service, ranging from Delta's dramatic 53.2% growth to Northwest's 0.4% growth from 2004 to 2007 [8]. Delta Airlines has even publicly stated this type of shift as their core strategy to improve revenues and yields [20]. Indeed, it is generally received that international markets, generally immune from LCC's hyper competition [21] (apart from Mexican and Caribbean markets), allow legacy carriers to charge higher fares. Although tending to be relaxed gradually, international bilateral agreements often specify the number of carriers, routes, capacities and fares for the service between two countries [22], thus limiting the level of competition on certain international markets. In addition to that, robust economic development in some foreign countries and the dwindling US Dollar can also drive up international demand from abroad. Reports have forecasted US carriers' international traffic to rise 8.9% in 2008, and with the US-EU open skies agreement finally in place since March 2008, the trans-Atlantic traffic is expected to grow even more [23].

Given these trends, it is thus interesting to look at how the traffic and economics of operations by US carriers to different regions of the world has evolved over time.

1.3 Thesis Objective and Structure

The objective of this thesis is to examine how the operational strategies for legacy carriers have changed in the US and how different factors affected the changes. More specifically, the evolution of operations of legacy carriers into different regions of the world from 1995 to 2006 will be analyzed in order to understand quantitatively how these strategies have evolved through time, the driving force behind the change, and the results of the changes. We will look at the relative traffic and capacity volumes in different regions, and compare the cost, revenues and profitability among them.

The rest of this thesis is divided into 5 main chapters. Chapter 2- Literature Review, Definitions, Dataset & Methodology will first outline relevant past research that had been done on the US airline industry, and then introduce the definition of terms needed to understand the analysis, as well as the dataset and methodology being used.

After that a detailed quantitative look at how capacity and traffic for different regions has evolved will be presented in Chapter 3- Analysis of Market Shift. This chapter is divided into two main parts, with the first part generating an aggregate view of the whole industry, and the second part looking into how carriers compare with each other.

Chapter 4- Analysis of Cost will then present a comparison and analysis of the operating cost of the different regions of operations. The chapter starts out with decomposing the unit cost components in order to get a fairer comparison among different entities, and then compare the figures among the different carriers.

Following that, Chapter 5- Revenues and Profitability will present a comparison of the characteristics of revenue generation and profitability across different regions. The first part of the chapter analyzes the evolution of unit revenue across the different regions, while the second part focuses on how the yields in different international market compare to the domestic market. The third part then brings in the cost in order to evaluate the relative profitability of each region, followed by a comparison of revenues and profitability among individual carriers in the fourth part.

Finally, Chapter 6- Conclusions will summarize the results and implications of the analysis. Future research directions will also be proposed.

Chapter 2

Literature Review, Definitions, Dataset & Methodology

This chapter provides necessary background information about the analysis that is useful in understanding the thesis. The literature review in Section 2.1 outlines relevant past research on the US airline industry and provides additional insight to the motivation behind this research, then Section 2.2 explains some of the common terminologies in the airline industry that are widely used throughout this thesis. Section 2.3 describes the dataset used for the analysis and the variables selected, while Section 2.4 outlines the methodology for data extraction and the aggregation method used in the analysis, followed by a chapter summary in Section 2.5.

2.1 Literature Review

A number of studies on the US airline industry have been carried out in recent years using comprehensive airline data from the US Department of Transportation. Geslin [2] conducted a study on fare and passenger change in the US domestic market from 2000 to 2004 using market level origin and destination data, and concluded that average fares in the USA declined around 16% between 2000 and 2004, with the entry of a low cost carrier in a market being the impact, causing an average of 31% decline in average fare.

Hub premium was found to have declined in the same period, while market concentration was found to be positively correlated with slightly higher fares.

Strina [24] performed a comprehensive study on trend and performance of the US airline industry from 1999 to 2004 in terms of traffic & capacity, cost & productivity and revenues & profitability. The study, which provided an overall view of the major US carriers as well as a comparison between legacy carriers and low cost carriers, shows a divergence of unit cost and a convergence of yield between the two airline groups, both of which highlights an unfavorable change of profitability of the legacy carriers relative to the low cost carriers.

Tsoukalas [9] on the other hand further focused just on comparing the cost and productivity between legacy carriers and low cost carriers. With a detailed breakdown in cost components, significant convergence of employee productivity, labor unit cost as well as unit cost (with adjustment for regional outsourcing and removal of influence of fuel cost) was actually discovered between the two groups of airlines during 2001 to 2006, showing how legacy carriers were able to successfully reduce cost and increase productivity in areas under their own control within the past several years.

However, most of these research studies focused on the comparison between legacy carriers and low cost carriers, and the market being studied was mostly system-wide operation without the further breakdown into regions of operation, i.e. domestic vs. international operations. It is for this reason that we have focused this research on the comparison among different regions of operations in order to gain additional insight into the current state and trends of the US airline industry.

2.2 Definition of Common Terminology

2.2.1 Legacy vs. Low Cost Carriers

Throughout this thesis the analysis will mainly be focused on so called “Legacy carriers”. Legacy carriers are often contrasted with a group of carriers referred to as “Low cost carriers”. These two types of carriers have different core characteristics, but the boundary between them is not always distinct, thus it is important to clearly define the grouping selected for our analysis.

Legacy Carriers

Legacy carriers in the USA usually refer to the group of long established airlines that had existed before the deregulation in 1978, which operate extensive hub & spoke network with international services. The six legacy carriers selected in this analysis are:

- American Airlines (AA)
- Continental Airlines (CO)
- Delta Airlines (DL)
- Northwest Airlines (NW)
- United Airlines (UA)
- US Airways + America West (US+HP)

Low Cost Carriers

Low Cost Carriers (LCC) usually refer to a group of airlines that offer generally lower fares in exchange for less passenger service or frills. These airlines usually have a lower cost structure and operate smaller point to point networks. The LCCs selected in this analysis are:

- Southwest Airlines (WN)
- JetBlue Airways (B6)
- AirTran Airways (FL)
- Frontier Airlines (F9)
- American Trans Air (TZ)

The US Airways + America West is a special case. US Airways was originally considered a legacy carrier, while America West was an LCC. In 2005, US Airways was bought by America West, and the two have since merged service under the name of US Airways, despite still filing their operating data to the Department of Transportation separately up to 2006. But in order to track the changes to the combined identity over the years, we have combined the data for the two carriers from 1995 to 2006 and treated it as one carrier. Furthermore, despite the fact that the new US Airways labels itself as an LCC, we have grouped the airline under legacy carriers because the airline possesses many attributes of a legacy carrier, i.e. extensive hub and spoke network and international services.

The eleven carriers listed above accounts for a majority of airline capacity in the US, comprising 84% of total capacity as of 2006 according to the US Department of Transportation Form 41 Data [13], and are thus representative of the US airline industry as a whole.

2.2.2 Mainline vs. Regional

Legacy airline operations are often composed of two main parts: mainline and regional.

Mainline Operations

Mainline operations are flights operated by the primary operating unit of the legacy carriers, and are the main subject to be analyzed in this thesis. Mainline flights are usually flown with large jetliners with seat capacity typically over 100.

Regional Operations

Regional operations are short haul commuter flights that legacy carriers outsource to franchised companies and/or their own regional subsidiary. Legacy carriers usually have agreements with those companies in which the regional partners get paid for transporting passengers, typically connecting traffic, on behalf of the legacy carriers, and in return the legacy carriers perform the marketing and selling for those flights. Regional flights are usually flown using small regional aircraft with seat capacity typically under 70, and provide feeder service to smaller communities for mainline operations. Nowadays

they are also sometimes used to increase frequency on routes already operated by mainline flights.

2.2.3 Airline Measures

Available Seat Miles (ASM)

Available Seat Miles is a summation of each available seat multiplied by the distance flown. ASM is the most commonly used indicator of the output capacity of an airline for transporting passengers.

Revenue Passenger Miles (RPM)

Revenue Passenger Miles is the summation of each paying passenger multiplied by the distance flown. RPM is a measure of the actual traffic carried by the airline's flights.

Cost per Available Seat Mile (CASM)

Cost per Available Seat Mile is the unit cost of an airline, defined as the operating cost divided by available seat miles:

$$CASM = \frac{\textit{Operating Expenses}}{\textit{Available Seat Miles}}$$

In other words, CASM indicates the cost of flying one seat for one mile, and can be used to compare cost efficiency between airlines. CASM can often be broken down into smaller components, such as Fuel CASM, where only the fuel cost is considered, or Labor CASM, where only the component of employee salaries and benefits are considered.

Revenue per Available Seat Mile (RASM)

Revenue per Available Seat Mile is the unit revenue of an airline, defined by the revenue divide by available seat miles:

$$RASM = \frac{\textit{Operating Revenues}}{\textit{Available Seat Miles}}$$

RASM is often compared with CASM to obtain the unit profitability of an airline. If the total revenue is used as the numerator, we get the Total Revenue per ASM (TRASM). But in order to isolate the main business of a legacy carrier (i.e. passenger carriage), and to eliminate the effect of irregular non-operating revenue such as the sale of a subsidiary, Passenger Revenue per ASM (PRASM), where only the ticket sales are considered, will mainly be used throughout the thesis. For convenience, in the rest of this thesis, unless otherwise specified, RASM would refer to passenger revenue per ASM only.

Yield

Yield of an airline is defined by passenger revenue over RPM, in other words, yield is the revenue that an airline makes on each passenger for every mile they travelled. It is a measure of the level of ticket price that passengers pay in general:

$$Yield = \frac{Passenger\ Revenue}{Revenue\ Passenger\ Miles}$$

Average Stage Length

Stage Length is the distance flown by an aircraft on one flight. Average stage length is calculated by the total revenue aircraft miles flown divided by total number of departures performed:

$$Average\ Stage\ Length = \frac{Revenue\ Aircraft\ Miles\ Flown}{Number\ of\ Departures}$$

Load Factor

Load Factor is the percentage of seats on an aircraft occupied by paying passengers. For one single flight, Load Factor is simply the number of passengers over the total number of seats. On the other hand, the average Load Factor for a collection of flights having various distances is defined as total RPM over total ASM:

$$Load\ Factor = \frac{Revenue\ Passenger\ Miles}{Available\ Seat\ Miles}$$

2.3 Data Set

2.3.1 US DOT Form 41

The primary data source for this thesis is the Form 41 filing reported to the US Department of Transportation (DOT) pursuant to 14 CFR Part 217 and Part 241. Form 41 contains traffic and financial data of major US carriers mandated by the DOT for public disclosure, and includes balance sheets, income statements, aircraft operating expenses by equipment type, and summary operating statistics by equipment as well as other financial and traffic schedules [24]. The Form 41 Data used in this thesis is accessed through the website of the US Department of Transportation- Research and Innovation Technology Administration- Bureau of Transportation Statistics (www.bts.gov) where various schedules of Form 41 can be downloaded in table form.

Region of Operation

The major feature of this analysis is to compare the differences between domestic operations and international operations. For this we make use of DOT's requirement for large certified carriers conducting scheduled services to establish four separate entities for the purpose of reporting to Form 41. The entities are as follows:

- Domestic Operations
- Operations via the Atlantic Ocean
- Operations in Latin American areas
- Operations via the Pacific Ocean

However, note that Canadian operations are filed under domestic operations, as according to 14 CFR 241.21, the domestic entity "shall embrace all operations within and between the 50 States of the United States, the District of Columbia, the Commonwealth of Puerto Rico and the U.S. Virgin Islands, and shall also include Canadian transborder operations". [25]

Data Extracted

Financial data from 1995 to 2006 for the eleven carriers listed in Section 2.2.1 were extracted from schedules P12, P6 and P52 in Form 41. The variables extracted from those schedules that are used in the analysis include:

- P12 : Profit and Loss Statement
 - Passenger Revenue
 - Transport Related Revenue
 - Transport Related Expense
 - Operating Expense
 - Operating Profit or Loss
- P52: Aircraft Operating Expenses
 - Fuel Expense
- P6: Operating Expenses by Objective Groupings
 - Labor Expense

Traffic data from 1995 to 2006 were extracted from schedules T1 and T2, and the variables extracted from those schedules that are used in the analysis include:

- T1: Traffic and Capacity Summary by Service Class
 - Passenger Enplanements
- T2: Traffic and Capacity Statistics by Aircraft Type
 - Revenue Passenger Miles
 - Available Seat Miles
 - Revenue Aircraft Miles
 - Revenue Aircraft Departures
 - Gallons of Fuel

2.3.2 Origin and Destination Survey

Another data source for this thesis is the Origin and Destination Survey (DB1B) also from the DOT, which will be used in the analysis of Chapter 5- Revenues and Profitability. It is a 10% sample of airline tickets from reporting carriers mandated by the Federal Aviation Act of 1958. Data includes origin, destination, price, distance

travelled and other itinerary details of passengers transported. The DB1B data was accessed through O&D Plus DVD-Rom, a commercial product distributed by Data Base Products, Inc.

Data Extracted

Through software of the O&D Plus DVD-Rom, instead of individual ticket by ticket data, summary data for each market city-pair can be obtained. For the analysis in this thesis, the following data were obtained for the Top 1000 markets in terms of passenger numbers in the first quarter of 2003 and 2006:

- Market Origin and Destination
- Carrier
- Average Yield
- Average Length of Haul

2.4 Methodology

Extraction and Processing of Data

The BTS website allows the download of each tabulated Form 41 schedule file in a year by year basis. Data needed for the analysis were extracted using Visual Basic scripts in Microsoft Excel. The codes scans through each table and searches for line items that match the criteria of the search, and then outputs the processed data into individual tables for each airline for further analysis. The various measures can then be computed from the raw data according to the formulas presented in Section 2.2.3.

Aggregation Methods

There are many aggregated metrics used throughout this thesis. In terms of regional entities, we sometimes group the metrics for Atlantic, Pacific and Latin America Operations into the category “International Operations”. For airline groups, we sometimes group the metrics for the 6 legacy carriers into 1 entity “Legacies”, or the 5 low cost carriers into 1 entity “LCCs”.

For the metrics that involve the division of two or more variables, e.g. RASM, CASM, Yield, Stage Length and Load Factor, proper aggregation method should be chosen when finding the average figure in order to get a number representative of the combined entities. For all of the aggregated “Average” figures presented in the thesis, we always sum up the raw data for the numerator and denominator respectively before performing division. In other words, they are all weighted averages as exemplified in the following equation for the average Atlantic RASM for the six legacy carriers combined:

$$RASM_{Legacies}^{Atlantic} = \frac{\sum_{i=1}^6 Revenue_i^{Atlantic}}{\sum_{i=1}^6 ASM_i^{Atlantic}}$$

Where $i = 1, \dots, 6$ is the list of the six legacy carriers defined earlier. Similarly, the weighted averages for the other measures and for the other regions can also be obtained in the same way by substituting different terms of the equation.

2.5 Chapter Summary

In this chapter we have introduced the basic terminologies that will be used throughout the thesis, the major data sources which the analysis is built on, as well as the methodologies of data extraction and data processing, all of which are important background information to understanding the analysis that is to follow.

In the next chapter we will start off our analysis by taking a detailed look at the extent of international expansion in recent years by US legacy carriers.

Chapter 3

Analysis of Market Shift

The first step in the analysis of US legacy carriers' international shift is to quantify the level of international expansion. Therefore in this chapter we will study this shift in detail, mainly in terms of passenger capacity assigned, and also in terms of actual traffic to different regions of the world. This chapter is made up of two major sections: Section 3.1 first examines aggregate industry trends, i.e. looking at the combined trends of groups of carriers, while Section 3.2 compares the trends among different carriers, as well as presenting detailed analysis of each individual carrier. The chapter is then concluded by a summary of results in Section 3.3.

3.1 Aggregate Comparisons

3.1.1 Legacy vs. LCC Capacity

Before going into the actual development of legacy carriers' international capacity, it is necessary to take a look at the competitive landscape between them and the Low Cost Carriers, because the rapid growth of LCCs, which compete with the legacies mainly on domestic markets, has commonly been cited as one of the primary causes of the financial crisis the legacy carriers faced [5], thus creating the setting for the shift to occur. Figure

3-1 shows the domestic ASMs for both aggregate Legacies and aggregate LCCs. It can be seen that domestic ASM for legacies reached a peak in 2000, and has been declining in general since then, decreasing by 16% from 2000 to 2006. The start of the decline coincides with the terrorist attacks in September 2001, which preceded a wave of legacy airline bankruptcies and other economy hurdles. LCCs on the other hand, have not been affected the same way. The ASMs for LCCs have grown steadily since 1995 through 2006, and in the period 2000-2006 when Legacies dropped capacity by 16%, they have increased their capacity by 86%. Looking at the total domestic ASM of legacy and LCCs combined, the figure remained roughly the same from 2000 to 2006, decreasing only by around 2%, showing how the LCCs have really taken up the domestic capacity.

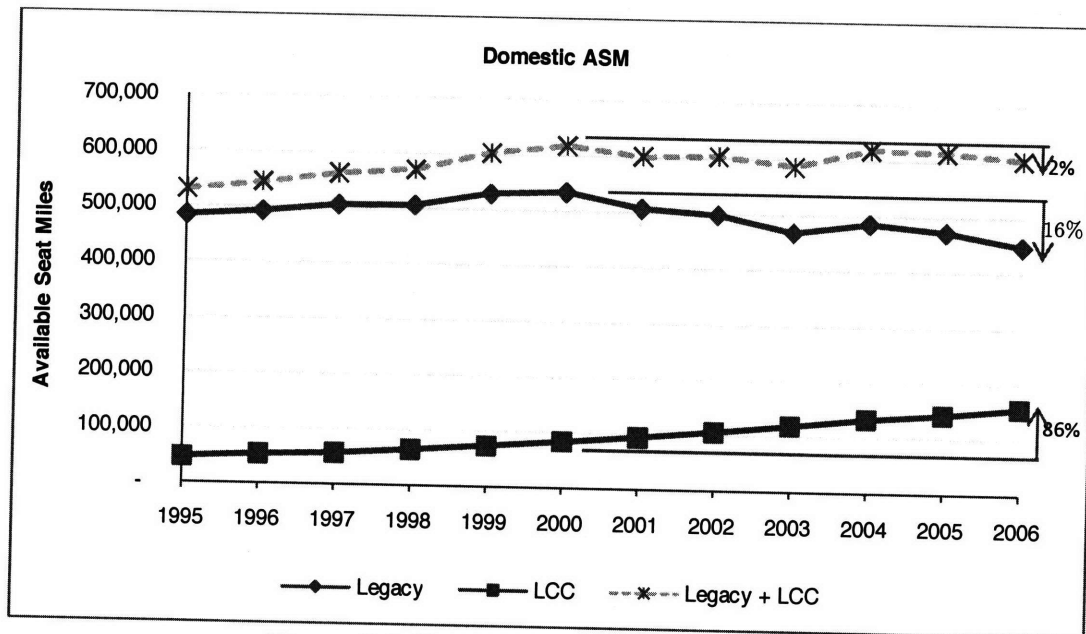


Figure 3-1: Domestic ASM Legacy vs. LCC

Proportion wise, Figure 3-2 shows the domestic capacity share between Legacies and LCCs from 1995-2006. LCC capacity share increased in the period shown, growing from around 9% in 1995 to 13% in 2000, then accelerated its growth, increasing from 13% to 25% in 2006. As studies have shown that entrance of a low cost carrier leads to lower prices on routes it has entered [26], it is of no surprise that, facing such a high exposure to LCCs, legacy carriers are facing enormous pressure on its domestic revenue stream.

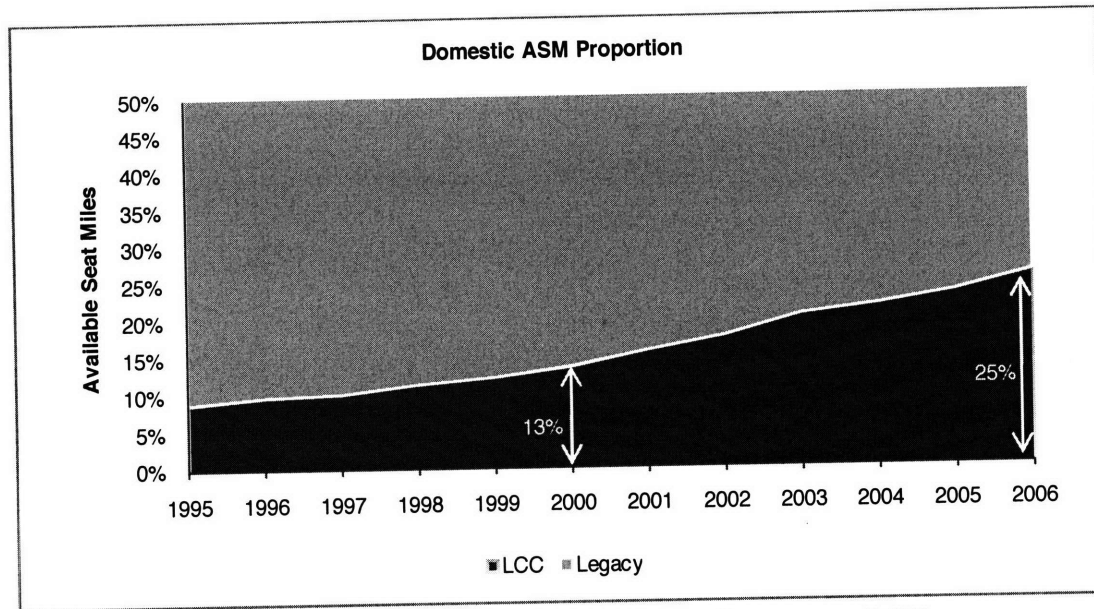


Figure 3-2: Domestic ASM Composition Legacy vs. LCC

3.1.2 Mainline vs. Regional Capacity

On the other hand, the legacies adapted their strategies in response to the toughening competition. One of the ways for legacies to reduce their cost is to outsource their capacity to regional partners and other feeder carriers. These carriers, which operate small regional airlines, typically have a much lower cost structure because of the lower pay scales of their employees and the lower level of service they provide. Figure 3-3 compares the ASM between the Mainline capacity of legacy carriers and their regional partners from 2000-2006. Within this time period, mainline capacity decreased by 18%, while regional capacity increased dramatically by 170%. However, the total capacity of Mainline and Regional combined decreased by 5%, showing that the increase in regional capacity did not fully compensate for the loss in mainline capacity.

In terms of the share between mainline and regional capacity, Figure 3-4 shows the domestic composition between legacies' mainline capacity and regional capacity from 2000 to 2006. It can be seen that the regional share increased significantly from 6% in 2000 up to 17% in 2006. All these are indications of how the domestic market has evolved over the years, showing that increasingly, legacy mainline capacity is not able to compete economically in the US domestic market.

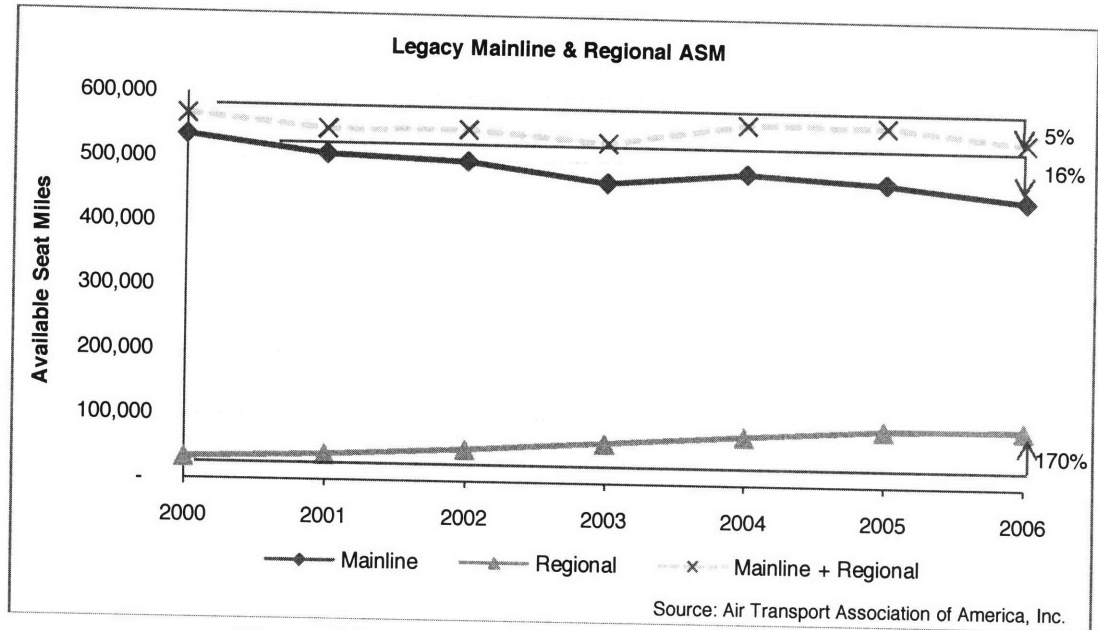


Figure 3-3: Domestic ASM Mainline vs. Regional

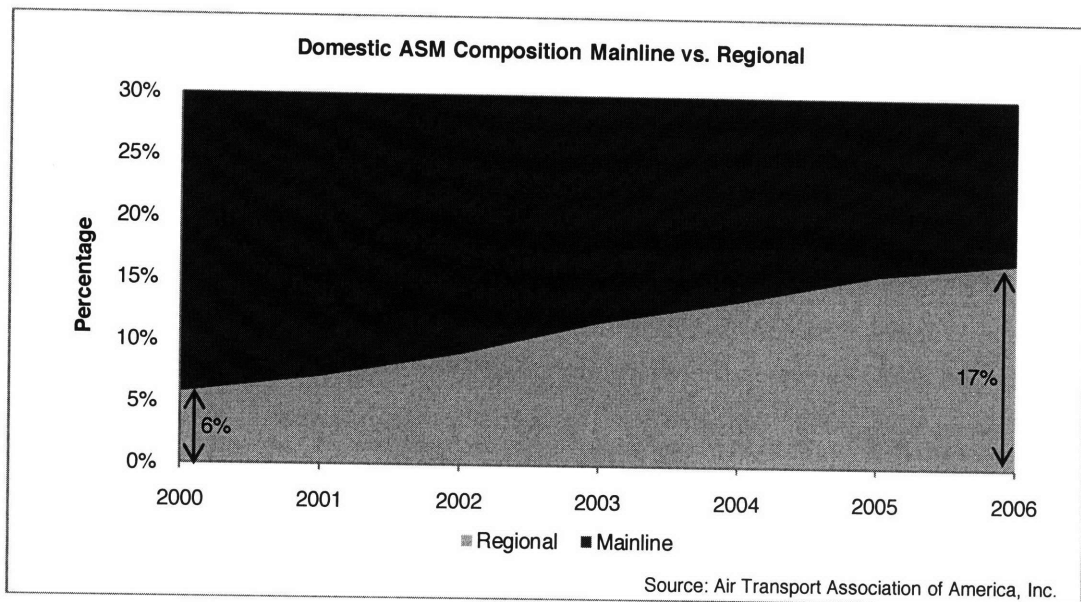


Figure 3-4: Domestic ASM Composition Mainline vs. Regional

3.1.3 Domestic vs. International Capacity

Having taken a brief look at the competitive landscape in the domestic market for the legacy carriers, we shall now take a look at how, for legacy carriers, the international capacity has evolved compared with domestic capacity. Figure 3-5 shows the international ASM and domestic ASM for legacy carriers in the period 1996 to 2006.

Observed on the graph is the seemingly similar trend between the 2 groups from 1995 to 2004, after which they took up a very different trend- domestic capacity decreased steadily, while international capacity went the other way. To quantify that, domestic capacity is down 5% in the period 2003-2006, while international capacity was up 26% in the same period.

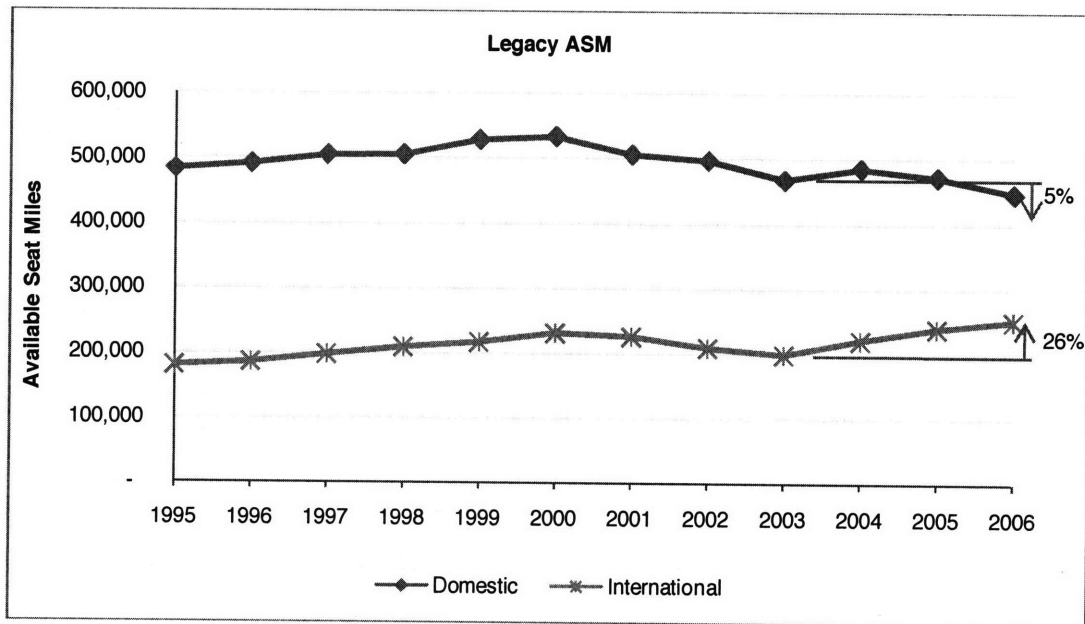


Figure 3-5: Legacy ASM Domestic vs. International

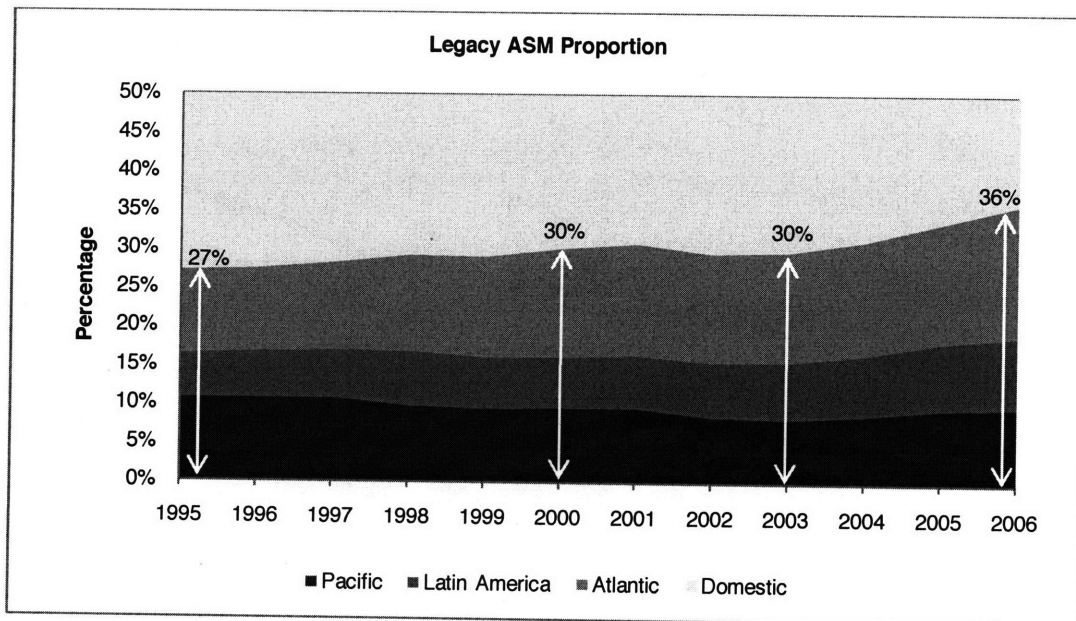


Figure 3-6: Legacy ASM Composition

Figure 3-6 shows the proportion of ASM between different regions. It can be seen that proportion wise, the share of international capacity in Legacy carriers had in generally been increasing even from 1995, increasing gradually from 27% in 1995 to 30% in 2000, reaching a plateau from 2000 to 2003, probably due to the weakened international travel demand after the terrorist attacks. However, 2003 seems to be the turning point of the shift in strategy towards more international capacity, with the proportion of international capacity growing 6 pts in just 3 years, from 30% in 2003 to 36% in 2006.

3.1.4 Average Stage Length

The shift to increasing international operations since 2003 can also be observed through the change in system wide average stage length through the years. International routes are in general longer than domestic routes, thus a higher proportion of international flying generally translates to higher average stage length. Figure 3-7 shows the system wide average stage length for legacy carriers from 1995 to 2006, from there it can be observed that although average stage length had been increasing since 1995, there is a clear jump in the slope at 2002, with an increase in average stage length of 17% from 2002 to 2006, much higher than the 7% increase in the previous 4 year period from 1998 to 2002.

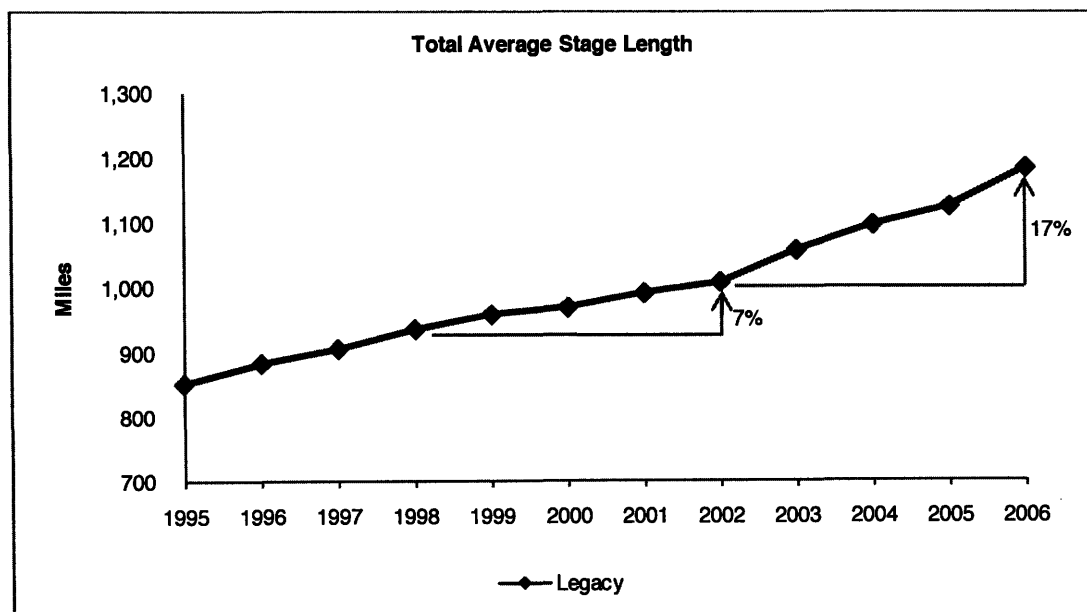


Figure 3-7: Legacy Total System Average Stage Length

3.1.5 International Region Comparison

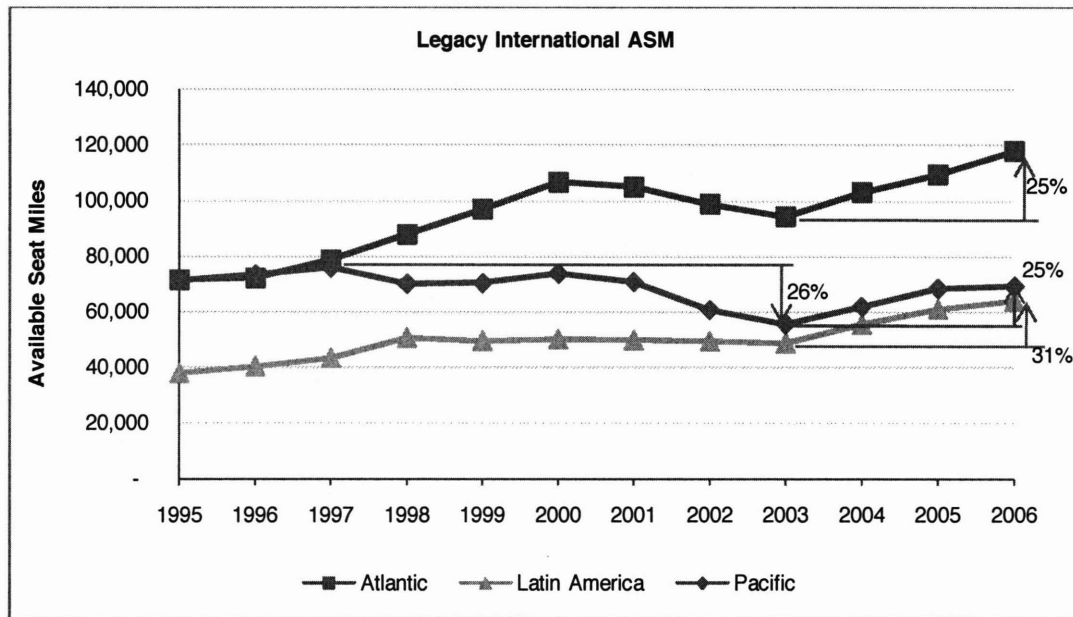


Figure 3-8: Legacy International ASM

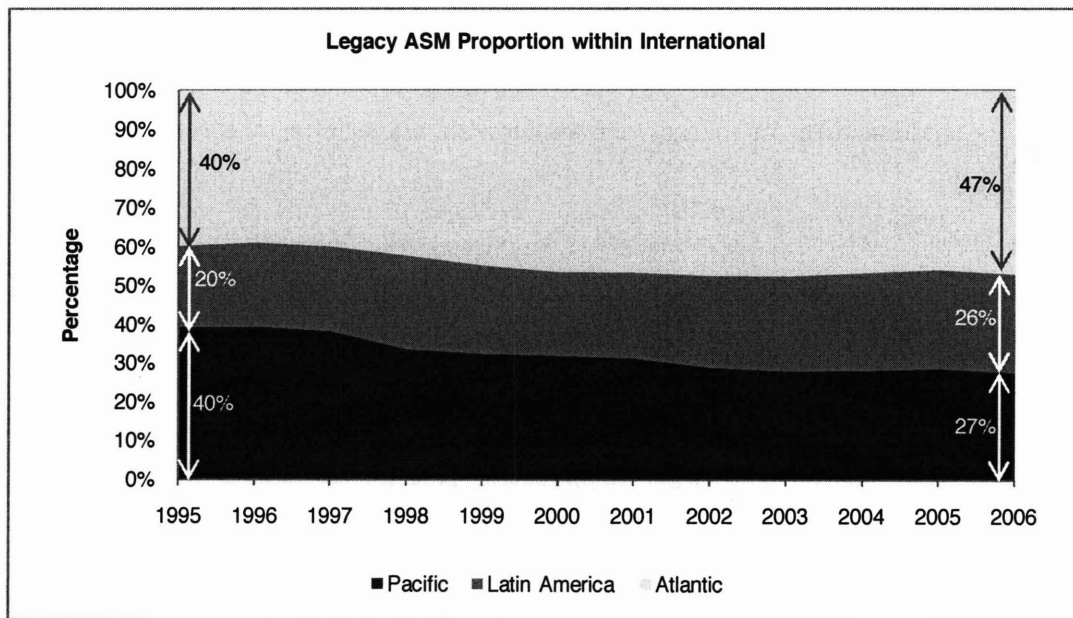


Figure 3-9: Legacy International ASM Composition

Figure 3-8 shows the evolution of aggregate ASMs for legacy carriers in the 3 international regions from 1995 to 2006. Looking within the international sector for all legacy carriers combined, all regions experienced significant growth from 2003 to 2006, with Atlantic, Pacific and Latin America capacity up by 25%, 25% and 31% respectively. This increase follows a period of decline or plateau from 2000 to 2003 probably due to the economic downturn, terrorist attacks, the war and SARS. On the

other hand, Pacific capacity significantly reduced when compared with the growth of the other 2 regions, having a 26% drop between 1997 and 2003. Looking proportion wise within the international capacity, as shown in Figure 3-9, it can be seen that the percentage of Pacific operations declined steadily since 1997, from around 38% to 27% of international capacity in 2006, while for Atlantic and Latin America, there is an increase of 7 points and 6 points respectively.

3.1.6 Traffic

A commonly used metric of how much traffic actually traveled on the capacity is the RPM (Revenue Passenger Mile). Load Factor is defined as RPM divided by ASM, which is the proportion between actual traffic and capacity. Thus with the Load Factor, one can observe the relationship between the capacity deployed in a market, and the actual traffic that utilized the capacity. Figure 3-10 shows the legacy load factor for the 4 different regions from 1995 to 2006. Clearly, the load factors for all regions have increased over the past decade, but with a strong drop in 2000-2001 that is common among all 4 regions. This drop is due to the carriers not being able to cut capacity as fast as the sudden drop in market demand for air travel after the terrorist attacks in September 11.

Comparing between the entities, it can be seen that Pacific and Atlantic flights generally have higher load factor than the other 2 regions. There are 2 possible explanations for that. One is that a lot of foreign countries do not have open skies agreement with the USA, then capacity between the countries might be limited by law, thus artificially driving up load factor. The other explanation is that the travelling time and time difference on long haul flights is such that flights need to depart at a small range of time in order for the passengers to arrive at their destination at a reasonable time, thus limiting the amount of frequency an airline can put into a route. On the other hand, airlines tend to compete in frequency on short haul routes, which make up a lot of domestic and Latin American routes, in order to capture a higher market share, thus lowering the load factor.

Figure 3-11 summarizes the changes in load factor for the 4 regions from 2003 to 2006. For all of the regions, load factor increased, though at a different rate. Domestic load

factor increased most significantly by 7pts, while Atlantic increased most modestly by only 2 pts. Thus if we look at the evolution of RPM for legacy domestic capacity, one can see that although the ASMs (i.e. capacity) decreased by 5% in 2003 to 2006, on the other hand RPMs, i.e. the actual traffic, in contrast actually increased by 5%, showing how legacy carriers have successfully made more efficient use of their resource by flying more traffic with smaller capacity, crucial in the current operating environment.

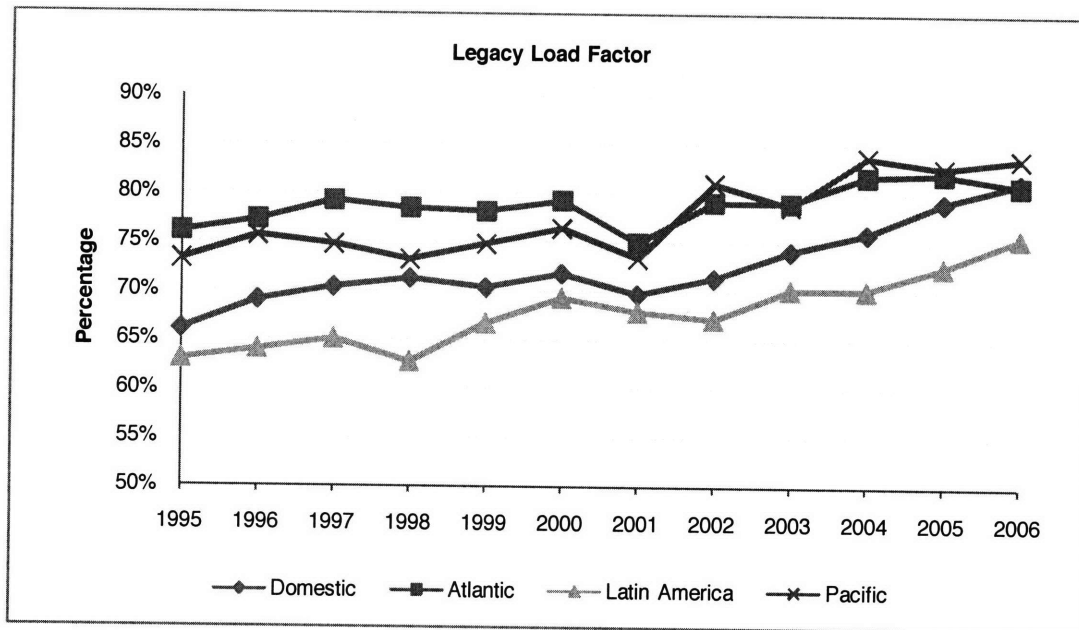


Figure 3-10: Legacy Load Factors

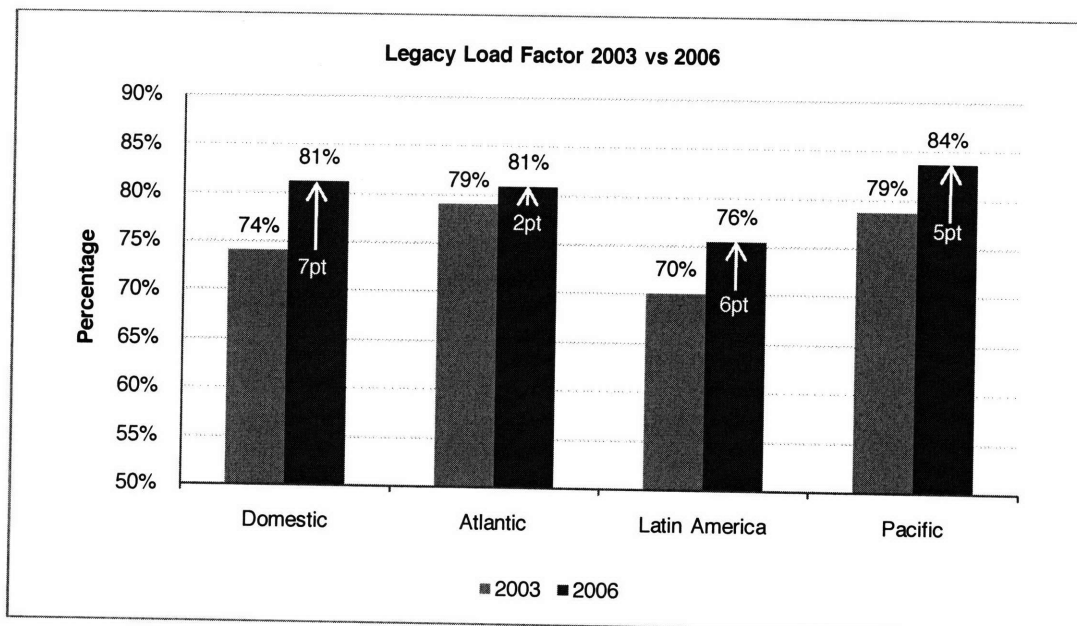


Figure 3-11: Legacies Load Factor in Different Regions in 2003 and 2006

3.2 Individual Airline comparison

This section explores the capacity trends of individual carriers, and is further subdivided into seven parts. The first part, Section 3.2.1, provides an overall comparison among the six legacy carriers, while the subsequent six parts discuss in detail each of those carriers individually.

3.2.1 Comparison of Capacity among Legacy Carriers

Previously it has been shown that US legacy carriers decreased domestic capacity by a combined 6% from 2003 to 2006. Figure 3-12 shows how each carrier changed its domestic capacity in the same time period. It can be seen that all carriers reduced their domestic capacity, with the notable exception of Continental Airlines, which in contrast increased its domestic capacity by 9% in the said time period. Among the five carriers that reduced domestic capacity, Delta was the most aggressive one with a reduction of 11%, followed by Northwest at 7%.

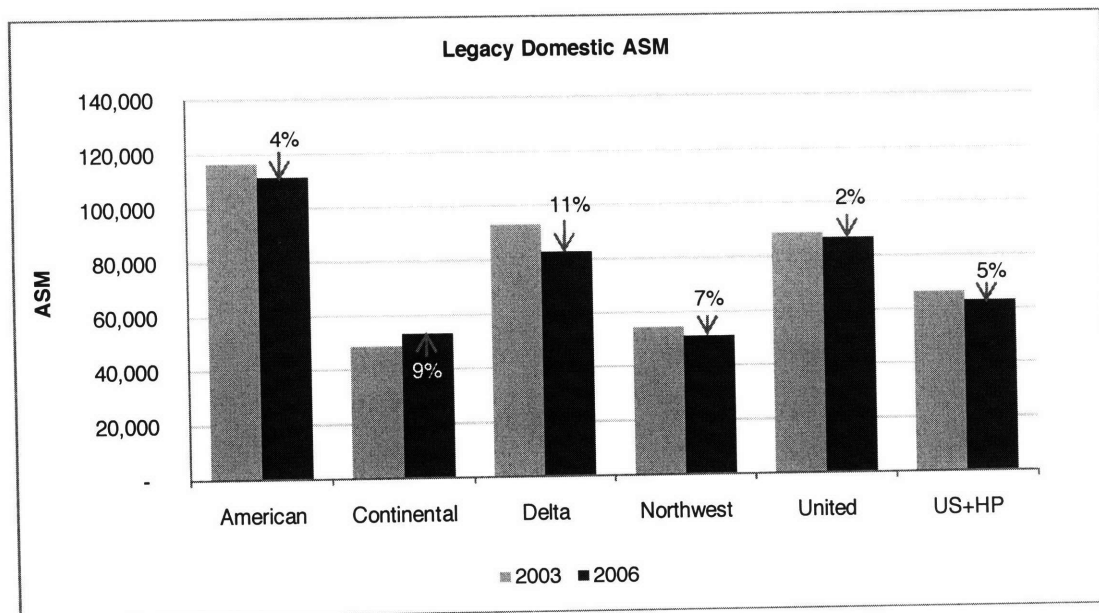


Figure 3-12: Domestic Capacity of Legacies 2003 vs. 2006

Figure 3-13 summarizes the international capacity for the six legacy carriers in 2003 and in 2006, showing the magnitude of each carrier's international operations as well as its change. In terms of magnitude, American is the biggest player in international operations, followed by United Airlines, while US Airways + America West is least

significant in international operations by a good margin. Northwest was third largest international operator in 2003, but by 2006 had been surpassed by both Continental and Delta, which had undergone the most aggressive international capacity growth at 56% and 48% respectively. American also increased its international capacity significantly by 28%, while United had a more modest growth of 18%, and US Airways + American West had a 11% growth. Northwest is distinctively the least aggressive in international capacity expansion, with only a 1% increase from 2003 to 2006.

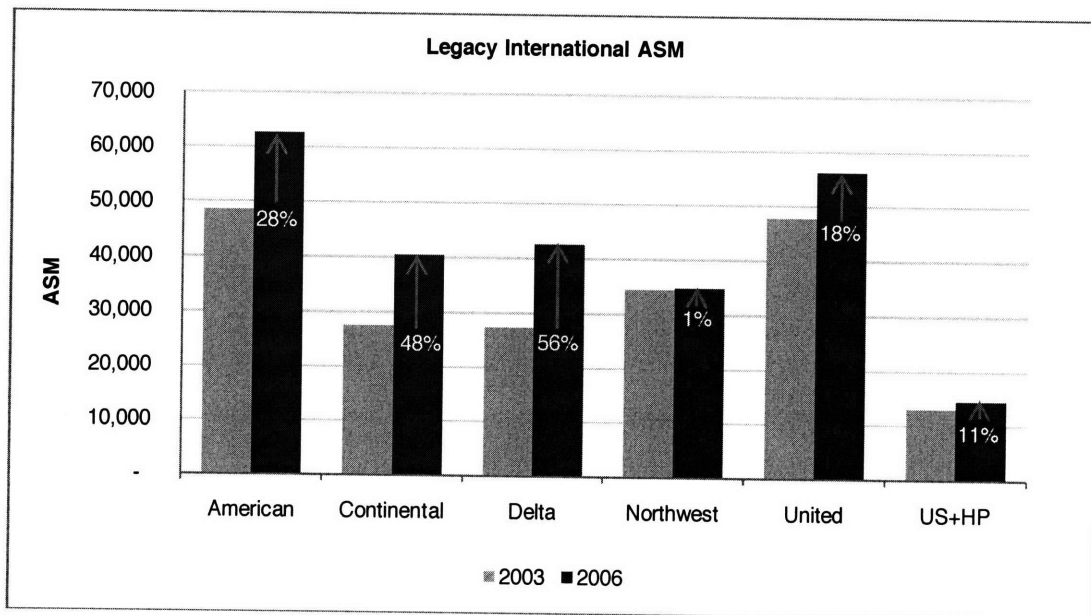


Figure 3-13: International Capacity of Legacies 2003 vs. 2006

The next three charts show the capacity of each carrier for Atlantic, Latin America and Pacific operations respectively in 2003 and 2006. From Figure 3-14 it can be seen that in 2006, after the aggressive expansion, Delta became the largest player in the Atlantic market, followed by American and Continental, both of which also undergone significant capacity growth in this region. The three smallest players, US Airways + America West, Northwest and United, all had little Atlantic capacity growth in this period comparatively.

Latin American capacity for the six carriers is shown in Figure 3-15, where it can be seen that American Airlines is by far the largest operator in this region, followed by Continental and Delta. Both United Airlines and US Airways + America West are relatively rather insignificant in this region, while Northwest has no operation to this region at all.

Pacific operations is dominated by Northwest Airlines and United Airlines, as shown in Figure 3-16, which together took up nearly 80% of total capacity in this region. Both American Airlines and Continental Airlines increased their Pacific operations by a dramatic percentage from 2003 to 2006 (94% and 62% respectively), but since the capacity is very small to start from, they still trail far behind the top two carriers in 2006. On the other hand, Delta Airlines is a tiny player in the Pacific market, while US Airways + America West is absent in this market.

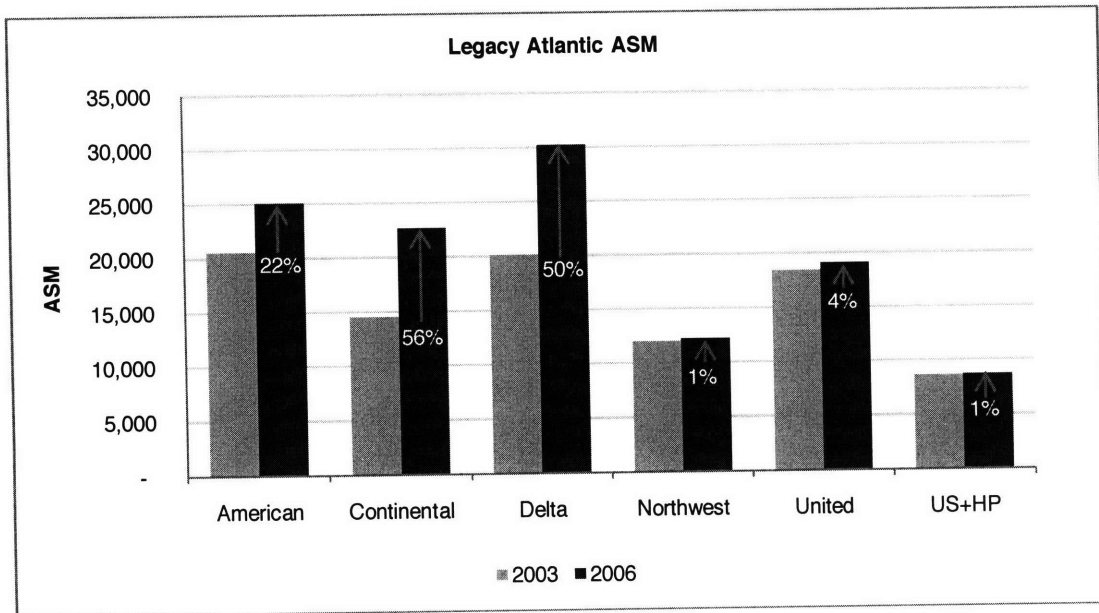


Figure 3-14: Atlantic Capacity of Legacies 2003 vs. 2006

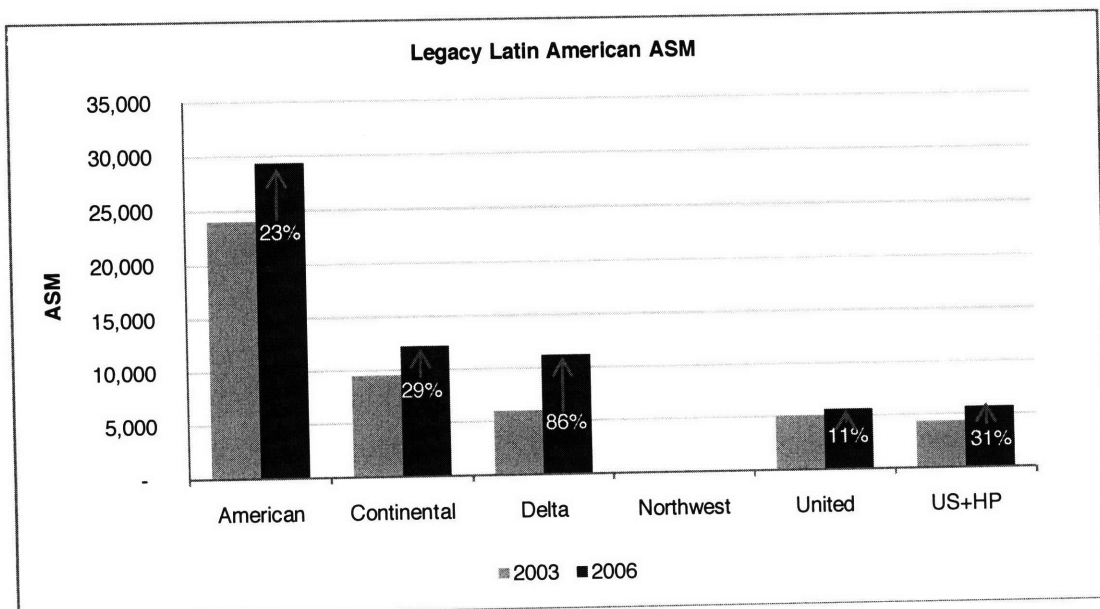


Figure 3-15: Latin American Capacity of Legacies 2003 vs. 2006

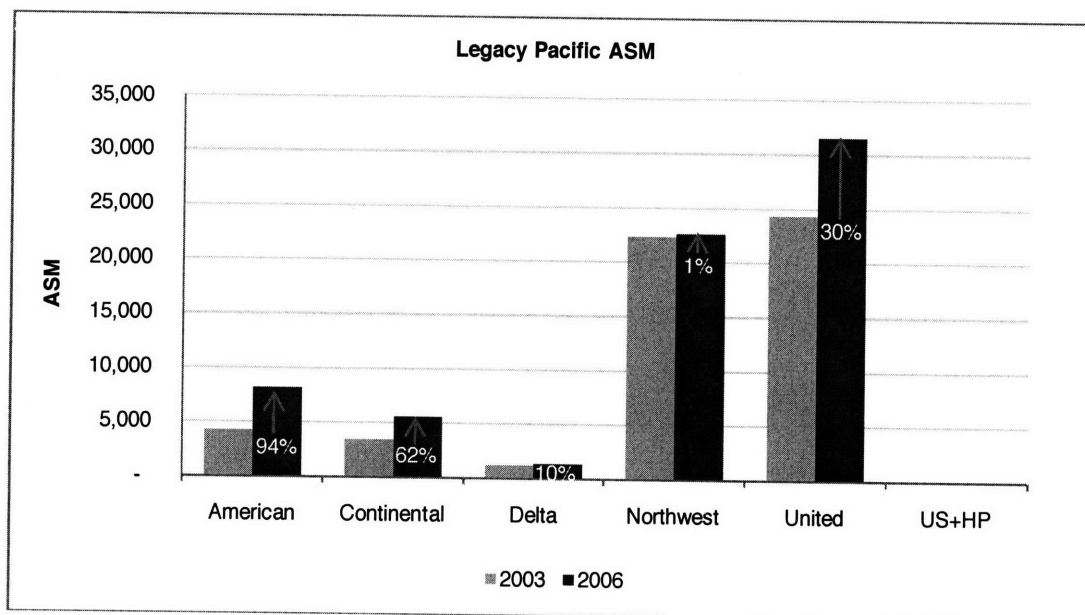


Figure 3-16: Pacific Capacity of Legacies 2003 vs. 2006

Table 3-1 summarizes the six legacy carriers' percentage change in capacity in the different regions from 2003 to 2006. It can be seen that basically, capacity to all international regions increased for all airlines in the said time period, while domestic capacity decreased for all carriers, with the exception of Continental Airlines which increased both its domestic and international capacity.

Table 3-1: Change in ASM for Different Regions 2003 to 2006

	Domestic	International	Atlantic	Latin	Pacific
AA	-4%	28%	22%	23%	94%
CO	9%	48%	56%	29%	62%
DL	-11%	56%	50%	86%	10%
NW	-7%	1%	1%		1%
UA	-2%	18%	4%	11%	30%
US+HP	-5%	11%	1%	31%	

Figure 3-17 summarizes each of the six legacy carriers' proportion of international capacity (out of their total system-wide capacity) in 2003 and 2006, highlighting the percentage in each year as well as the change in the period. Among them, Continental has the highest international percentage in 2006 with a figure of 43%, followed by Northwest, United, American and Delta, while US Airways + America West has the lowest percentage. In terms of change in international share, all carriers have increased the international capacity share in this period, with Delta leading the crowd 11pt increase, followed by Continental and American Airlines both at 7 points. United

Airlines, Northwest Airlines and US Airways + America West all had less significant growth in international capacity share, with only a 4 point increase for United, and a 2 point increase for Northwest and US Airways + America West.

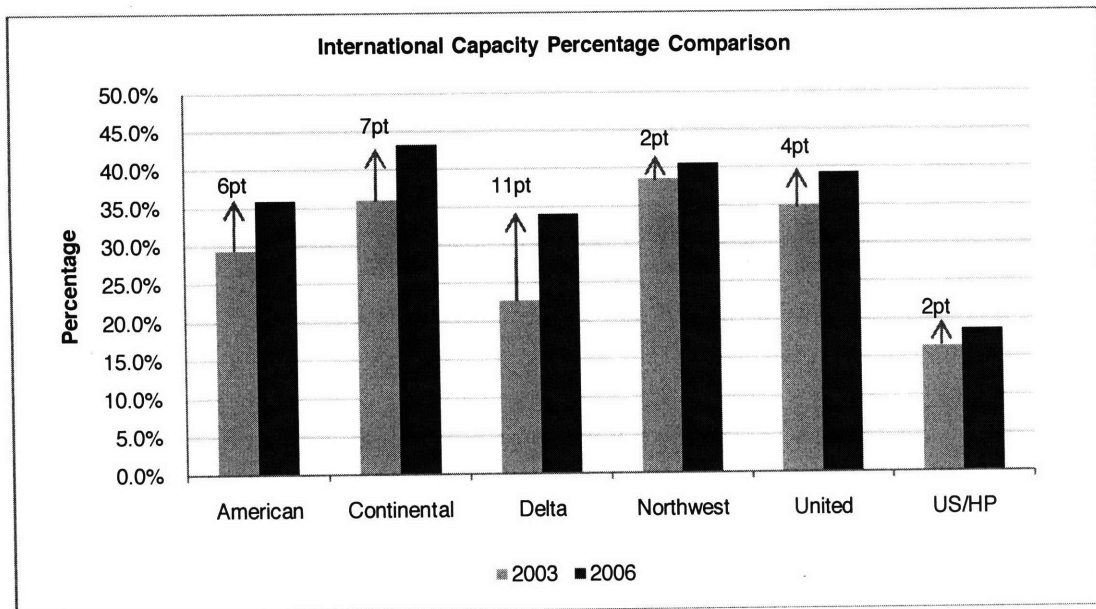


Figure 3-17: Legacies International Capacity Percentage Comparison

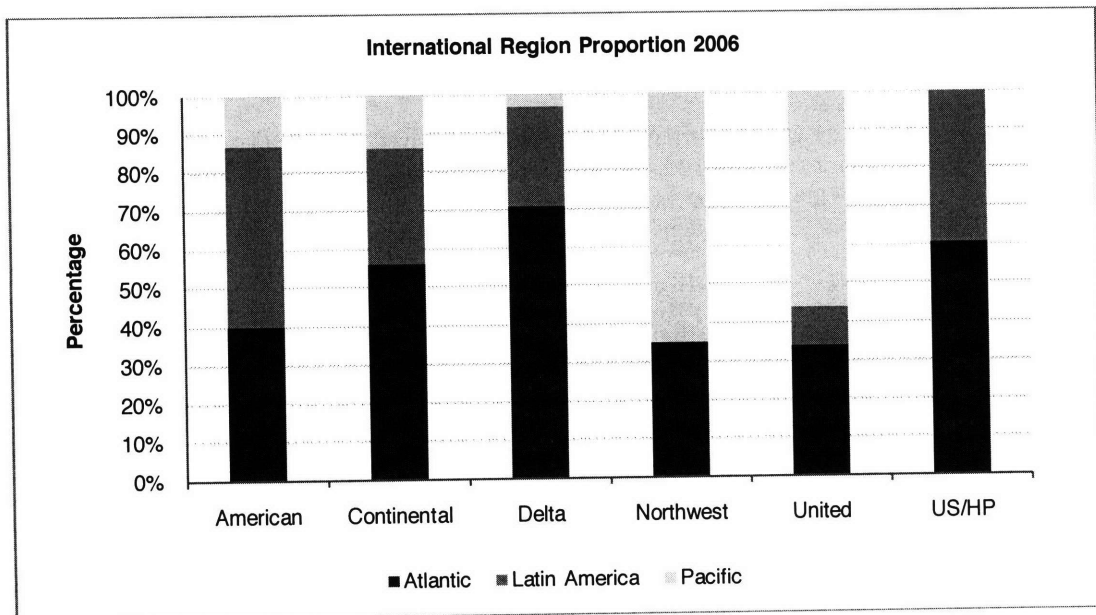


Figure 3-18: Legacies International Capacity Composition

Figure 3-18 shows the traffic region composition for each of the 6 legacy carriers in 2006. From here we can easily observe the focus of each of the carriers. Northwest and United has a clear focus on Pacific operations with a capacity share of 65% and 56% respectively. Delta, US Airways and Continental focuses more on Atlantic operations,

where it takes up 70%, 60% and 55% of the international capacity share respectively. American puts more focus on Latin American operations, with its capacity taking up 45% of the total international capacity.

Starting from Section 3.2.2 below, we shall give a brief discussion on each of the six legacy carriers' evolution of capacity in different regions in the past decade.

3.2.2 American Airlines

Looking at American Airlines' ASM in Figure 3-19, the first thing one would notice would be the step increase of domestic capacity in 2000-2001 by 20%. This coincides with the merger with TWA which increased its capacity by a significant amount as it took over the other airline's hub. Change with international operations is very apparent after 2003, where international capacity grew by 28% in 3 years while domestic capacity dropped by 4%.

In terms of proportion, international percentage had been increasing steadily since 2002 after the merger with TWA, increasing from 28% in 2002 to 36% in 2006 as shown in Figure 3-20.

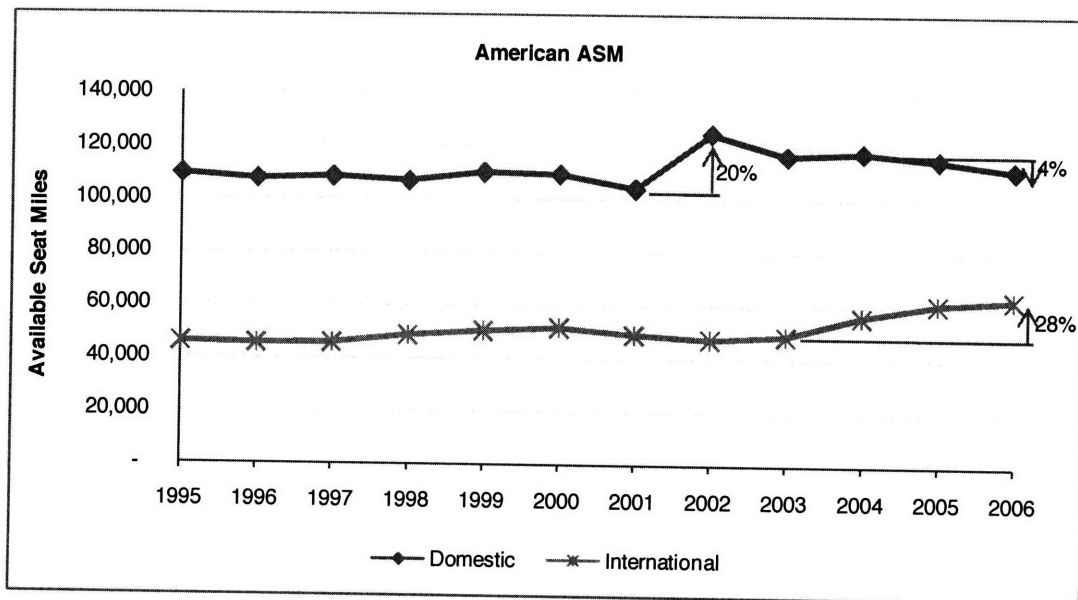


Figure 3-19: American Airlines Capacity International vs. Domestic

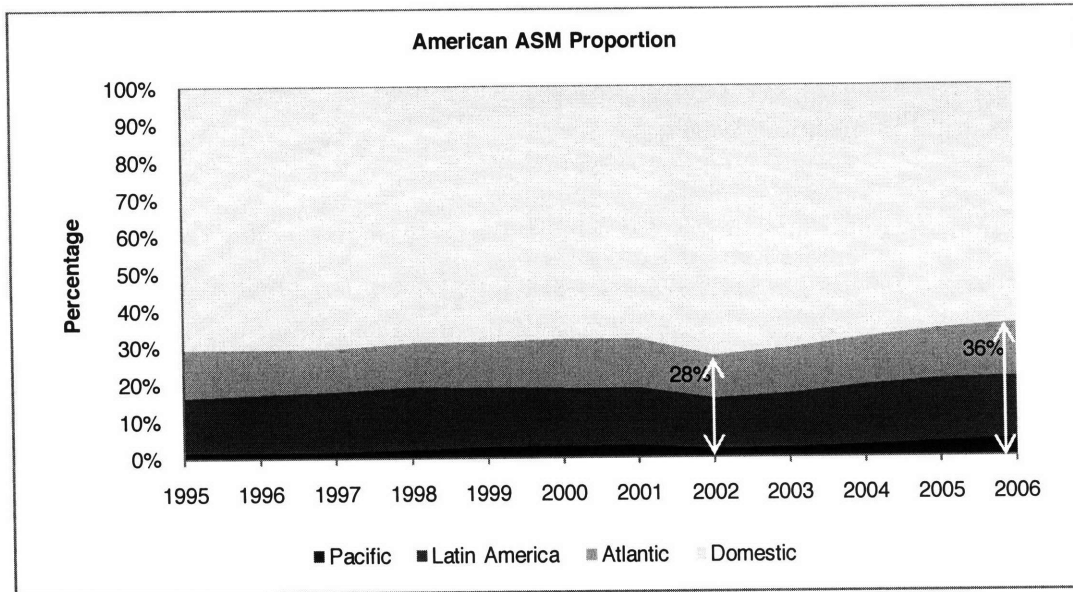


Figure 3-20: American Airlines Capacity Composition

As shown in Figure 3-21, international capacity for all 3 regions has increased from 2003 to 2006 by 22%, 21% and 96% for Latin America, Atlantic and Pacific respectively. The increases for the three regions are similar in absolute magnitude, but Pacific percentage increase is especially dramatic because AA only has a small amount of Pacific capacity compared with the other regions, taking up only 13% of all international capacity in 2006. Other than that, the capacity proportion between the different regions had been rather stable over the years, with Pacific always having the lowest share of capacity.

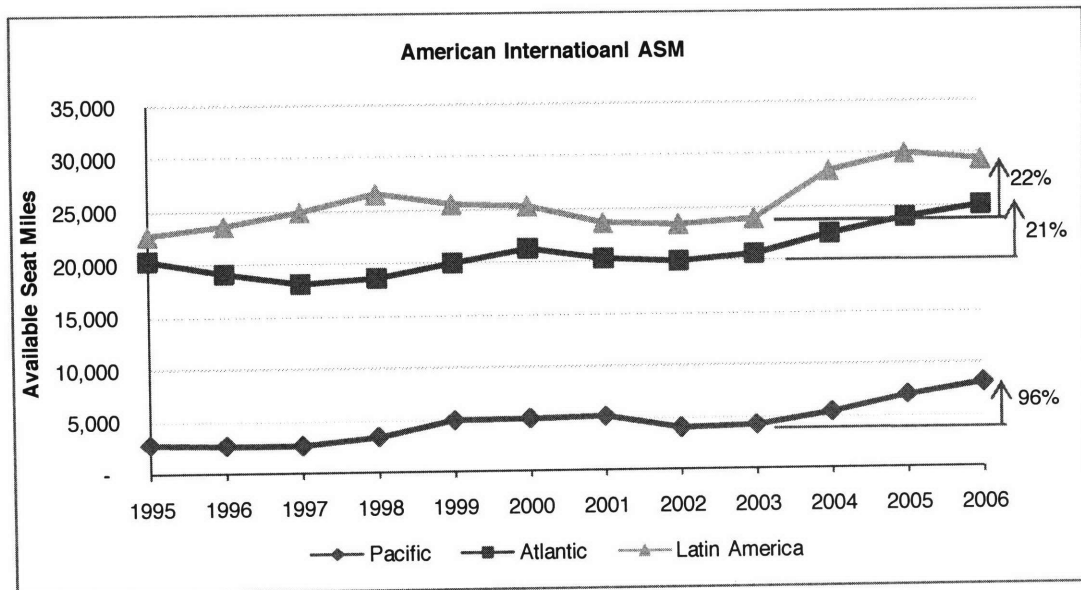


Figure 3-21: American Airlines International Capacity

3.2.3 Continental Airlines

Continental has had a very aggressive international growth over the last decade, not just after 2003, but also from 1996 to 2000. As shown in Figure 3-22, between 1995 and 2006, international capacity increased by 360% while domestic capacity only increased by 16%. The international expansion is more modest from 2003 to 2006, with a capacity increase of only 48%, but still one of the highest among the legacy carriers just after Delta.

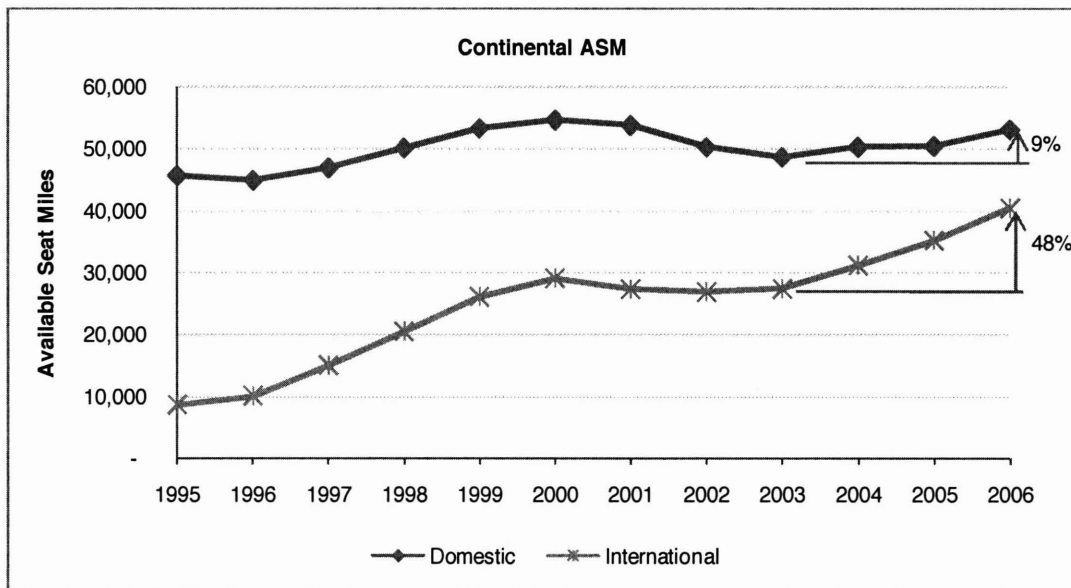


Figure 3-22: Continental Airlines Capacity International vs. Domestic

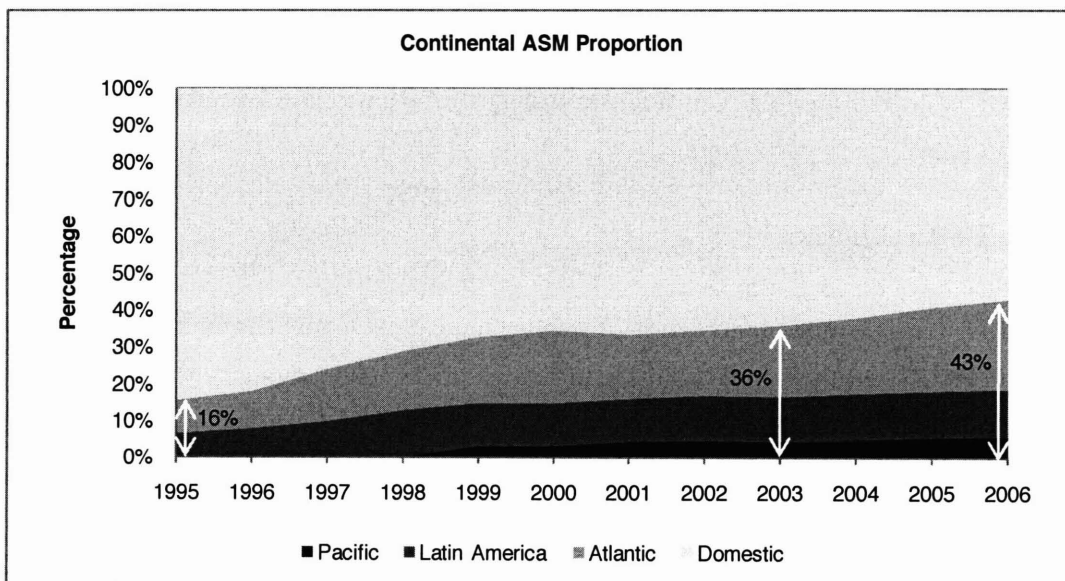


Figure 3-23: Continental Airlines Capacity Composition

Likewise, as seen in Figure 3-23, Continental's proportion of international capacity has grown strongly over the years, growing from 16% in 1995 to around 36% in 2000. After remaining rather flat for the subsequent few years, international capacity share increased significantly again from 36% in 2003 to 43% in 2006.

Since 2003, international capacities for all 3 regions for Continental have increased strongly, by a figure of 67%, 29% and 62% for Atlantic, Latin America and Pacific respectively. It is reported that between August 2002 and August 2004, Continental added 32 net new cities to its international network, far more than any of its competitors [27], and from Figure 3-24 it can be seen that the growth in Atlantic capacity is the major element of Continental's international expansion.

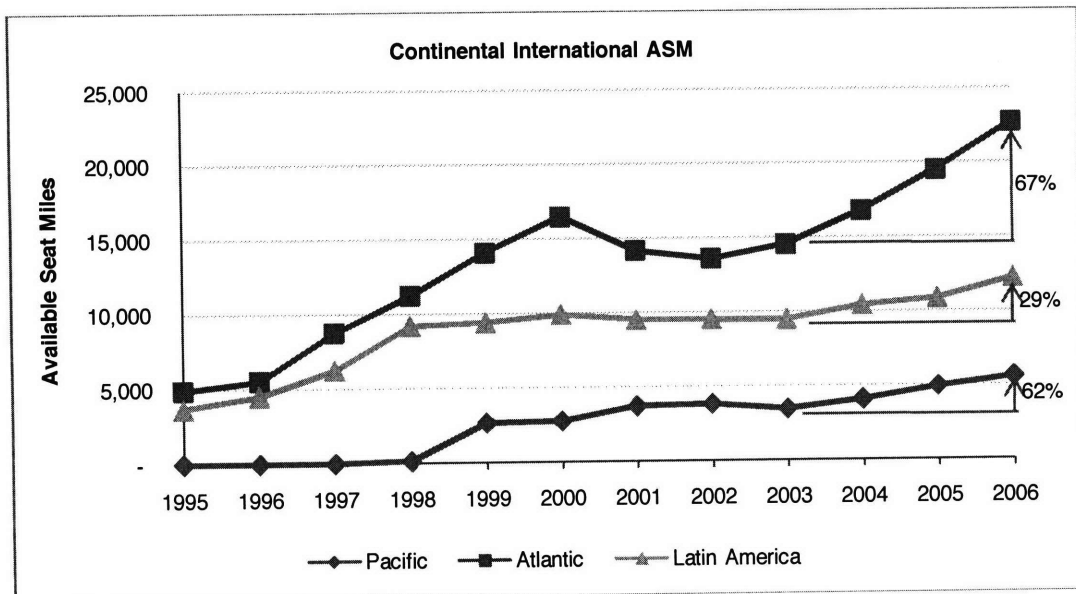


Figure 3-24: Continental Airlines International Capacity

3.2.4 Delta Airlines

Delta has a trend similar to the rest of the legacy carriers, but the intensity is the most dramatic. As shown in Figure 3-25, Delta's drop in domestic capacity started from 2000, with a decrease of 26% from 2000-2006. The drop is especially exaggerated from 2005 to 2006, where ASMs decreased by 16% in one year. In contrast, international capacity grew 36% during the same 2000-2006 period.

Delta's international expansion is the most aggressive among all legacy carriers from 2003 to 2006, with a 56% increase which is more than twice the average increase of 26%. The airline has stated the international expansion as one of its key strategies to bring its average yield up [20], and with plans to unveil 20 new international destinations in 2008 [28], the dramatic expansion is expected to continue after 2006.

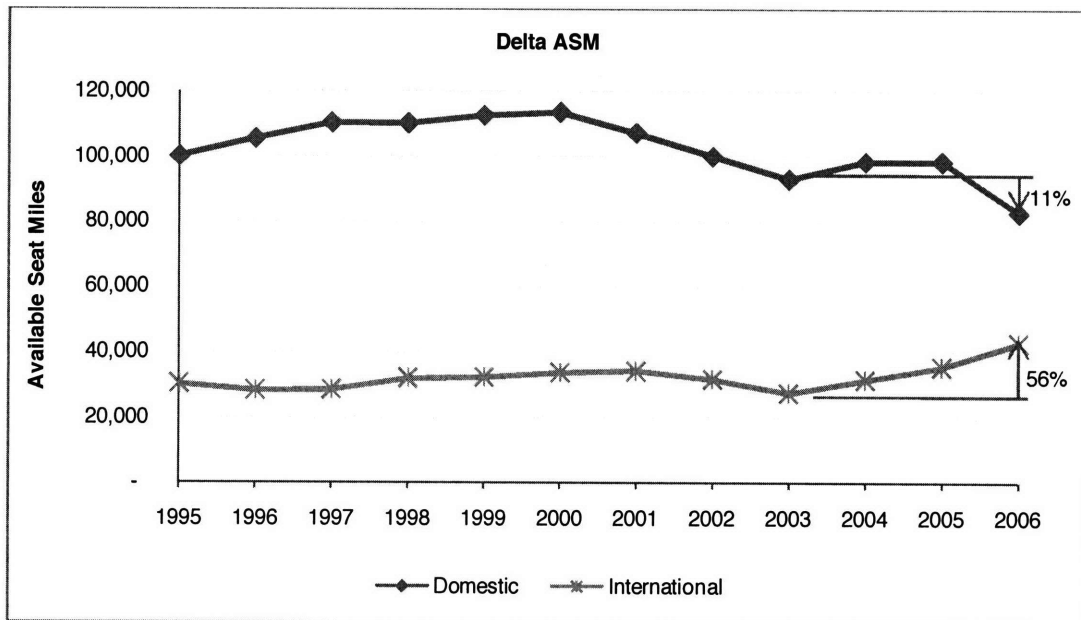


Figure 3-25: Delta Airlines Capacity International vs. Domestic

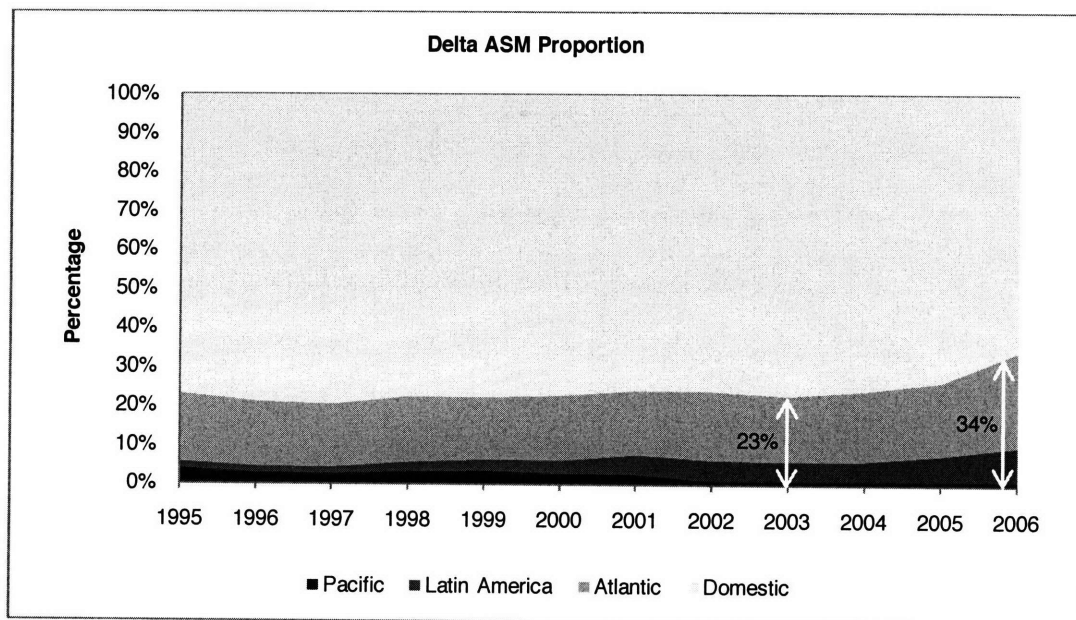


Figure 3-26: Delta Airlines Capacity Composition

Proportion wise, Delta's international share had been kept quite flat from 1995 to 2003, keeping at roughly 23% of its total capacity as evident in Figure 3-26. But since 2003 there is a clear upward trend, growing from 23 % to 34 % in 3 years, and the growth is going steeper and steeper. Delta's international capacity share is expected to grow even further, as the airline has publicly announced its intention to increase its international capacity share to 40% of its total capacity in 2008 [20].

From Figure 3-27 it can be seen that for the period 2003-2006, Atlantic capacity increased by 50%, and Latin American capacity increased by 81%. On the other hand, Pacific capacity has dropped significantly from 1999 to 2002, with a drop of 75% when delta cut all but one Asia-Pacific route to Tokyo, after which the capacity has remained the stable at a low level.

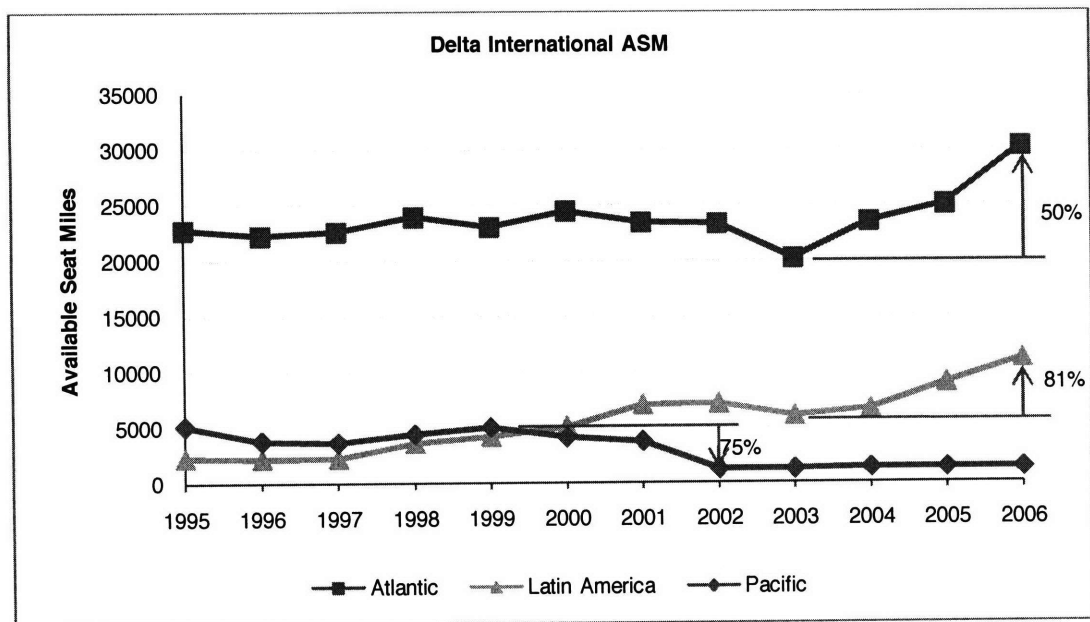


Figure 3-27: Delta Airlines International Capacity

3.2.5 Northwest Airlines

Change in capacity for Northwest had been quite flat for both domestic and international operations when compared with other airlines. But same as other carriers, there is an observable change in operational strategy after 2003- from Figure 3-28 it can be seen that domestic ASM decreased by 7% in the period 2003 to 2006, while international capacity grew by a modest 1% in the same period.

Due in part to historical reason where Northwest was granted rights to operate a base in Japan after the Second World War, the carrier has very high percentage of international capacity compared with other US carriers, with a figure consistently around 40% over the past decade as shown in Figure 3-29, which is the highest among all legacy carriers up till 2005 when it was surpassed by Continental Airlines. However with the lowest international capacity increase out of the six legacy carriers, the growth in international share from 2003 to 2006 is a modest 2 point growth, from 39% to 41% of total ASM.

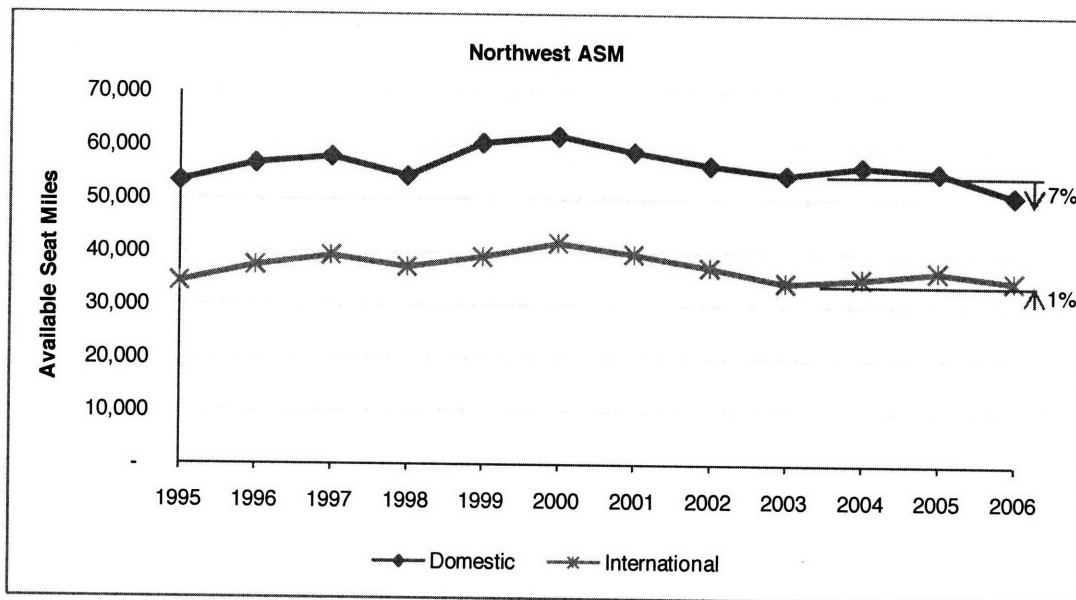


Figure 3-28: Northwest Airlines Capacity International vs. Domestic

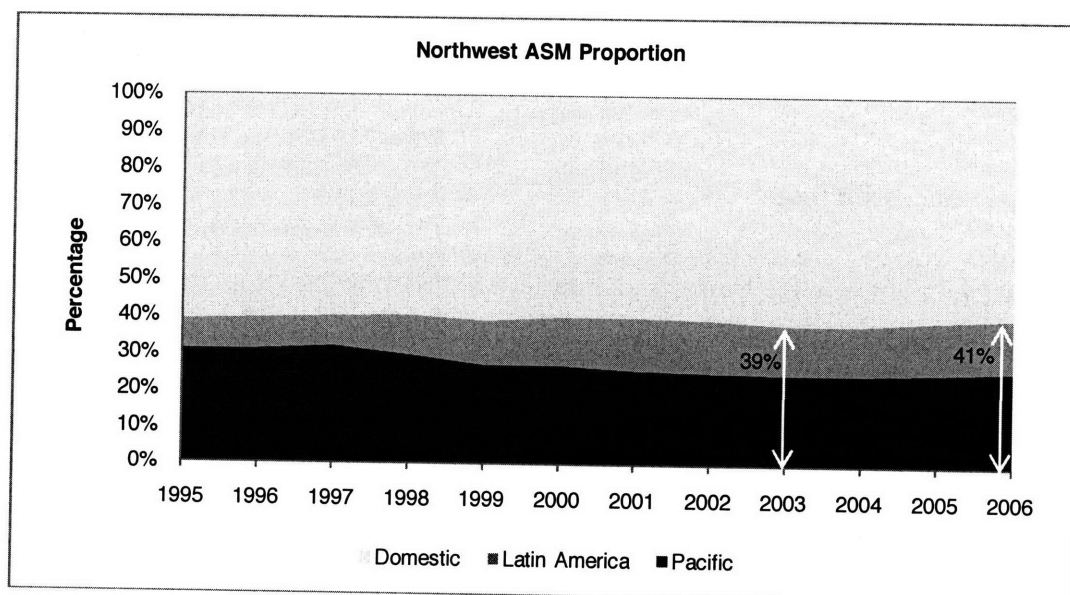


Figure 3-29: Northwest Airlines Capacity Composition

Pacific operation is Northwest's strongest foothold, while the carrier has no operations to Latin America at all. But as shown in Figure 3-30, from the period 1997 to 2001, there is a clear shift of emphasis between Pacific and Atlantic operations, with Pacific ASM declining by 18% while Atlantic ASM increasing by 75%. With that, the Atlantic capacity share among northwest international capacity increased from around 21% to 35%. On the other hand, the balance between the 2 regions had been kept very similar after that. In terms of ASM growth, both regions saw a modest 1% growth from 2003 to 2006. Also observed in Figure 3-30 is the slight dip in ASM for both regions from 2005 to 2006. This actually coincides with Northwest's system wide capacity cut of 7% capacity 2005-2006, which affected the domestic operations as well.

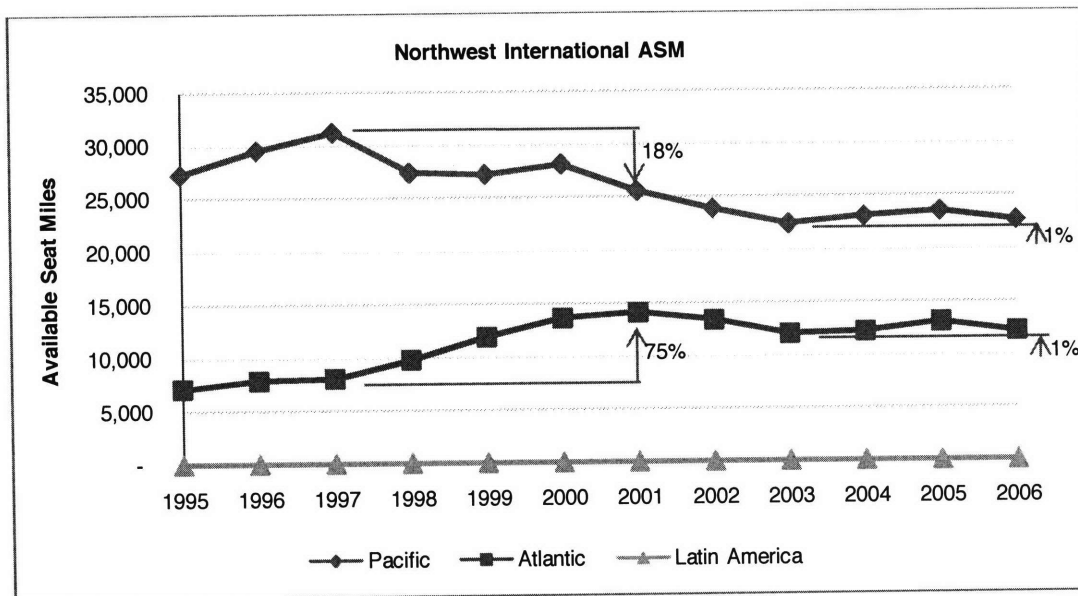


Figure 3-30: Northwest Airlines International Capacity

3.2.6 United Airlines

As shown in Figure 3-31, United's domestic ASM saw a 2% drop from 2003 to 2006 while its international capacity increased significantly by 18%, in line with what many other carriers were experiencing. This shift follows a dramatic system wide capacity cut around its bankruptcy in 2001, which saw a 22% cut in domestic ASM from 1999 to 2003, and a 25% cut in international capacity from 2001 to 2003.

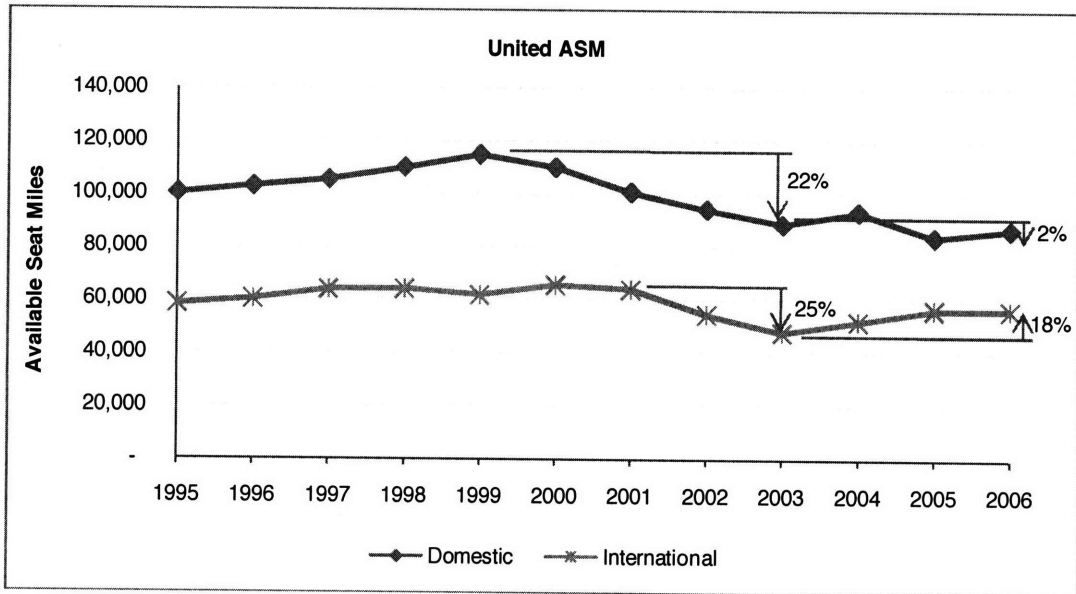


Figure 3-31: United Airlines Capacity International vs. Domestic

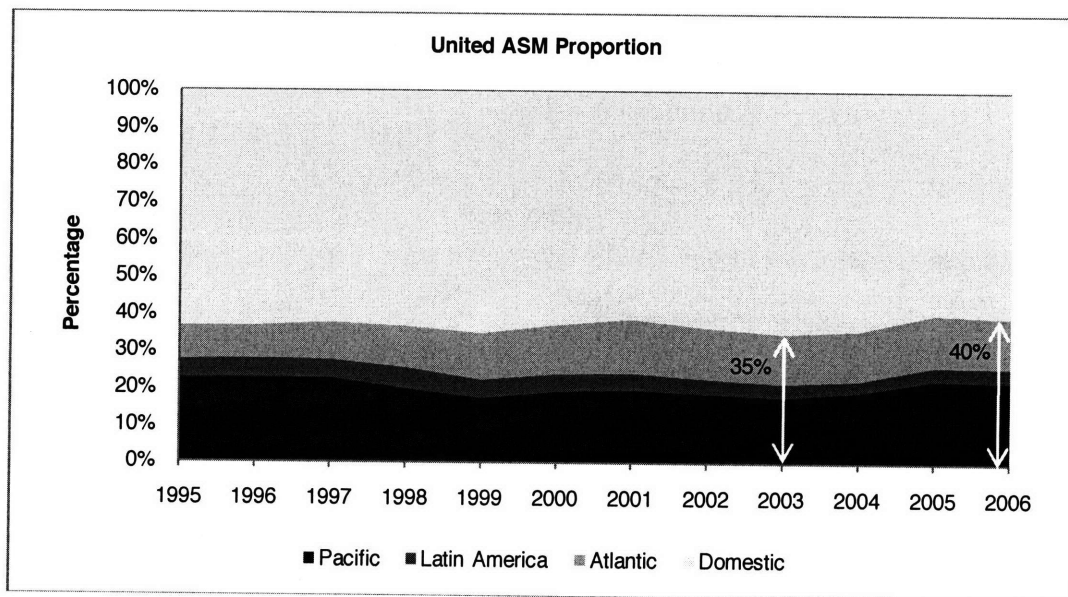


Figure 3-32: United Airlines Capacity Composition

United's international capacity share had in general been quite consistent, fluctuating between 35% and 40% as demonstrated in Figure 3-32. In the period 2003 to 2006, there is a clear increase of international capacity share from 35% to 40% of total capacity. For detailed international ASM change, from Figure 3-33, it can be seen that in the period of 2003 to 2006, the strongest growth occurred in Pacific, with a 29% increase in capacity, while for Atlantic and Latin America the increase was 2% and 10% respectively. However, even with Pacific's huge growth, the capacity in 2006 is still short of the capacity it once had in its 1997 peak, since then a period of strong decline left the Pacific ASM 36% lower in 2003 than in 1997.

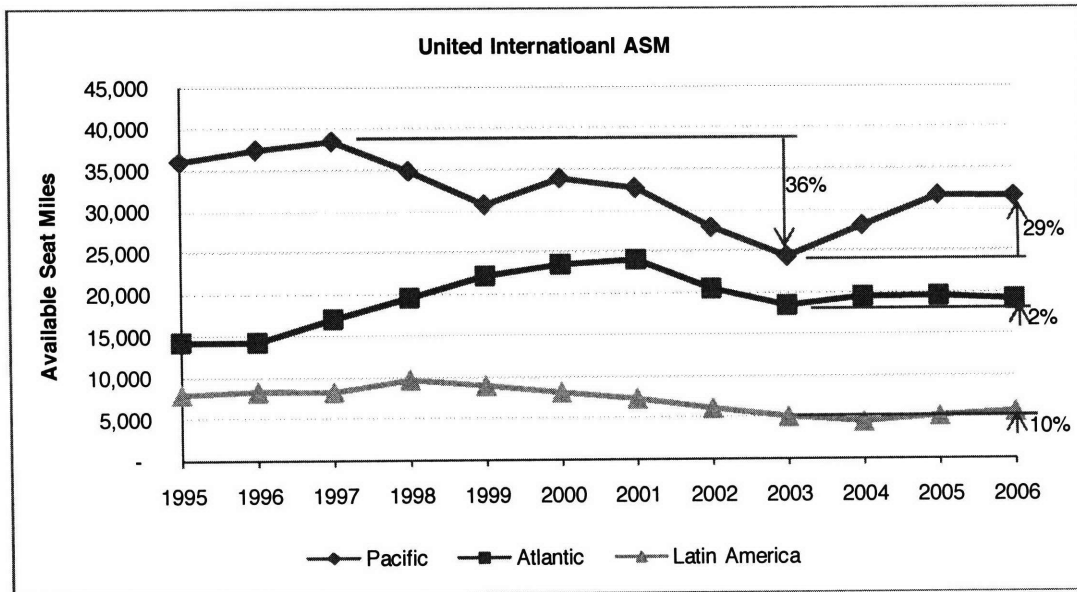


Figure 3-33: United Airlines International Capacity

3.2.7 US Airways + America West

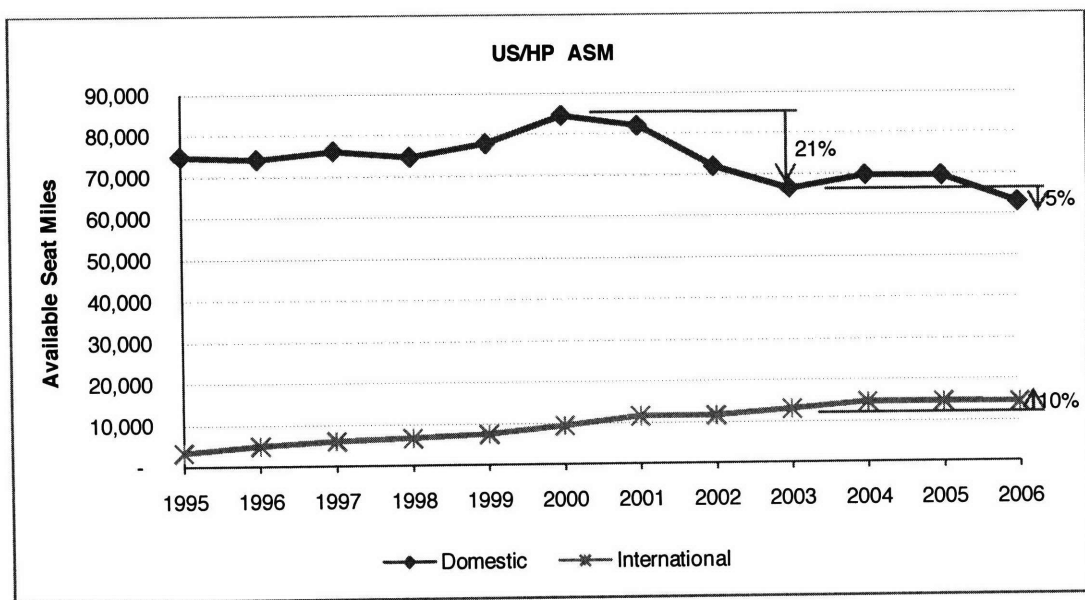


Figure 3-34: US Airways + American West Capacity International vs. Domestic

Since US airways merged with America West Airlines in 2005, we combined the numbers for both carriers in order to track the changes of the combined entity over time. Figure 3-34 shows the evolution of domestic and international ASM for the combined entity from 1995 to 2006. Two very different trends appear for the two types of operations. International ASM had been increasing steadily since 1995, while domestic ASM reached

a peak in 2000, then dropped by 21% from 2000 to 2003 following the terrorist attacks and its subsequent bankruptcy protection. As for the period of 2003 to 2006, in line with other legacy carriers, domestic ASM had dropped by 5% while international ASM increased by 10%.

From Figure 3-35 it can be seen that the international capacity share for US Airways + America West are much lower than that of other legacy carriers, with only 16% in 2003 and increasing up to 19% in 2006. This is due to the fact that America West is a low cost carrier and it mainly operated domestic service, thus diluting the percentage of international capacity in the combined entity.

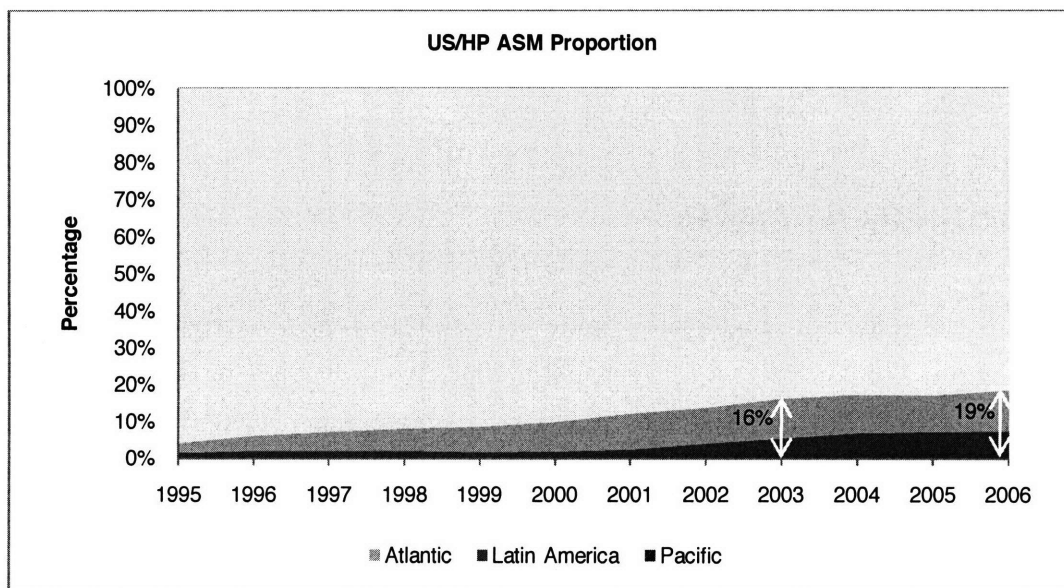


Figure 3-35: US Airways + America West Capacity Composition

Looking at the capacity for individual regions in Figure 3-36, it can be seen that from 1995 to 2001, most of the growth in international capacity was driven by Atlantic operations, where the capacity grew 350% over the period before leveling out. From 1999, growth in Latin American picked up, increasing by 290% from 1999 to 2004 before leveling out. Looking at the period 2003 to 2006, Atlantic capacity remained very similar, while Latin American increased by 30%. However, the 30% is mainly from 2003-2004, after which the capacity growth seemed to have stalled.

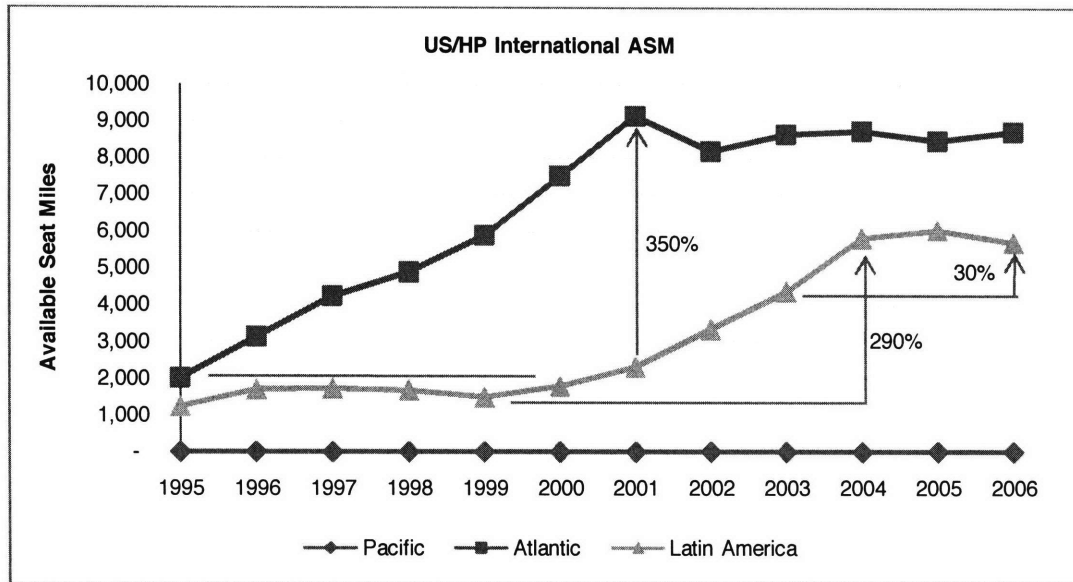


Figure 3-36: US Airways + America West International Capacity

3.3 Chapter Summary

To summarize, facing a greater and greater exposure to Low Cost Carriers, which have reached a 25% US domestic capacity share in 2006, legacy carriers in the USA decreased mainline domestic capacity by 16% from 2000 to 2006. Since 2003 these carriers have also increased international capacity, raising the capacity by 26% from 2003 to 2006, in contrast to a 5% decrease in domestic capacity, bringing the proportion of international capacity from 30% of all operations to 36%. Within international operations, the importance of Pacific operations for US legacy carriers has declined in the past decade, dropping from 40% of all international capacity in 1995 to only 27% in 2006. Atlantic operations make up the largest share of international capacity, amounting to 47% of all international capacity in 2006, while Latin American operations is sized similarly as Pacific operations with 26% of international capacity in 2006. In terms of capacity growth rate from 2003 to 2006, the three regions are comparable, with Atlantic at 25%, Latin America at 31% and Pacific at 25%.

All six US legacy carriers expanded their international capacity and shrunk their domestic capacity from 2003 to 2006, with the exception of Continental Airlines which expanded its domestic capacity as well. Different carriers had different levels of international capacity expansion, with Delta Airlines leading the group with a 56%

increase, while Northwest Airlines was the least aggressive with only 1% increase. In terms of the increase in percentage of international capacity from 2003 to 2006, Delta was the highest at 11 points, followed by Continental at 7 points, American at 6 points and United at 4 points. Northwest and US Airways + America West had the least shift at only 2 points.

Having looked at the extent of international shift quantitatively, we shall start the analysis of cost in the next chapter, with the intention of finding out how, or whether the cost environment in different regions contributed to this shift, as well as how these new strategies affected the cost environment in different regions.

Chapter 4

Analysis of Cost

In the previous chapter we established that all US legacy carriers increased the share of international capacity during 2003 to 2006. It is reasonable to expect that the business environment should have changed, at least already apparent before 2003, in a way that it favors international operations. Therefore in this chapter we shall compare the cost of production across different regions of operations in an attempt to investigate whether changes in costs have resulted in the shift, and how these strategies have in turn affected the cost. We will mainly look at two time periods- from 2000 to 2003 in order to study the conditions preceding the change, as well as 2003 to 2006 in order to study the changes during the shift.

However, when analyzing cost among different regions within the same airline, a major issue immediately arises: although airlines in the USA report their expenses to the DOT in four different entities, namely domestic, Atlantic, Pacific and Latin America, the network nature of airline operation means that these different entities share a variety of resources, such as aircraft equipment, gates, ground handling, sales and promotion, administrative, overheads just to name a few. Thus unless each of the entities within the same airline operate completely independently, it will always be hard to define a fair way to allocate those shared expenses among the entities. And to further complicate matters, different airlines use different allocation schemes, making it difficult to compare between airlines as well. Nonetheless, we still performed some analysis of cost among the different

entities, based on the accounting reported by the airlines, but focusing more on the relative trends of cost components in different entities rather than the actual magnitude.

Section 4.1 of this chapter presents the total CASM among different regions, followed by the analysis of transport related in Section 4.2. Section 4.3 then analyzes the evolution of fuel cost, while Section 4.4 presents a fairer metric for comparison, the CASM with fuel cost and transportation related cost excluded. Section 4.5 analyzes each of the carriers individually, after which a Summary of Chapter is given in Section 4.6.

4.1 Total Unit Costs

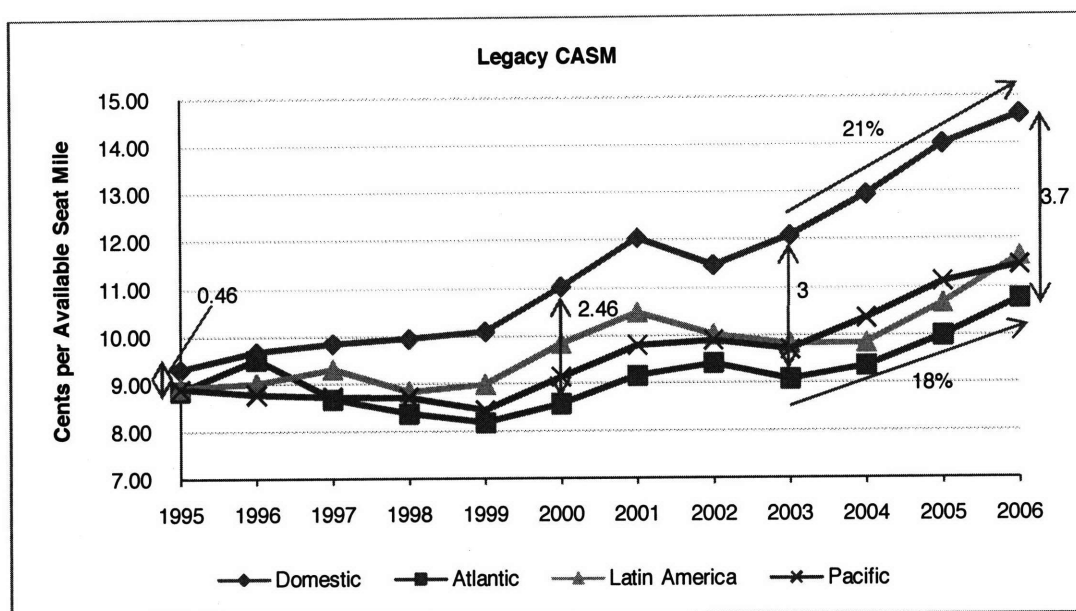


Figure 4-1: Legacy CASM Trend

To get a preliminary overview of the cost evolution, we first take a look at Legacies' total CASM of the 4 different entities from 1995 to 2006. As shown in Figure 4-1, the difference in CASM between domestic operations and international operations had clearly been diverging, with the domestic CASM increasing at a much higher rate than the international CASMs. In 1995, domestic CASM was only 0.46 cents higher than the lowest one, but by 2003, this gap had reached 3 cents, further increasing to 3.7 cents in 2006. Overall the CASM had been increasing. From 2003 to 2006, domestic CASM increased by 21% while each of the international CASMs increased by around 18%. With domestic unit cost rising faster than international unit cost, the push for international

shift seems very obvious. However, we know that total CASM is distorted by domestic Transport Related costs. Thus to understand the driving force behind the divergence in CASM figure among the regions, we need to take a look at the transport related cost.

4.2 Transport Related Costs

Transport Related Expense are defined as “Expenses related to the generation of Transport Related Revenues – which come from the US Government as direct grants or aids for providing air transportation facilities and all services which grow from and are incidental to the air transportation services performed by the carrier” [25]. Usually, this category of expense mainly includes legacy carriers’ payment to regional carriers for the outsourcing of regional operations to smaller communities. In recent years legacy carriers had increasingly outsourced more and more domestic short haul flying to regional partners due to their lower cost structure.

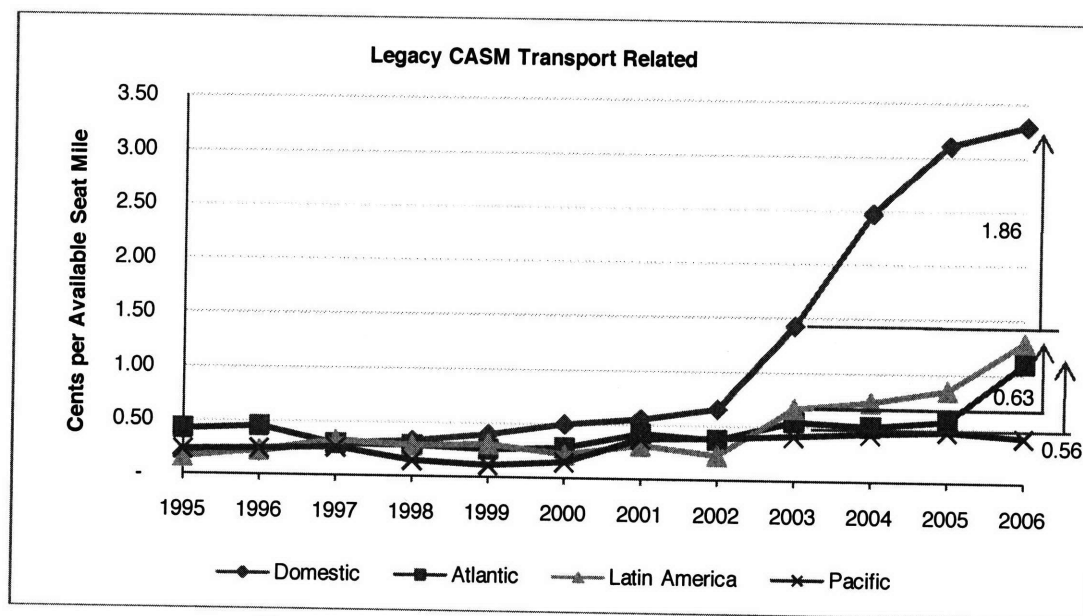


Figure 4-2: Legacy Transport Related CASM

Figure 4-2 shows the evolution of Transport Related Cost per ASM for Legacies from 1995 to 2006. From 1995 to 2002, Transport Related CASM for all regions remained relatively flat below the 0.7 cents range, but from 2002 onwards, domestic Transport Related CASM hiked sharply, diverging considerably away from the international regions. From 2003 to 2006, the domestic figure was up by 1.86 cents, while for Latin

America and Atlantic, the figure was up by only 0.63 cents and 0.56 cents respectively, 3 times less than domestic. Pacific Transport Related CASM remained practically unchanged.

The immediate effect of this outsourcing, apart from the increased Transport Related Cost show above, is the lowering of ASMs in the mainline operations, since the ASMs of regional carriers are not accounted in mainline operations. This tends to cause an upward bias in the calculation of Total CASM, since the cost of production, i.e. the Transport Related Expense, is accounted for in the numerator, whereas the unit output, i.e. the ASM of regional flights, is not accounted for in the denominator.

In order to remove this bias, we removed the Transport Related expense from the total cost and obtained the Total CASM Ex Transport Related. As shown in Figure 4-3, after the removal of Transport Related Expense, the cost curves became a lot more parallel, and have even converged a little in recent years, from a gap of 2.24 cents in 2000 to 2.12 cents in 2003, further reducing to 1.68 cents in 2006. With the adjusted international unit cost rising closer to the domestic unit cost, the reason for international shift doesn't seem well supported now.

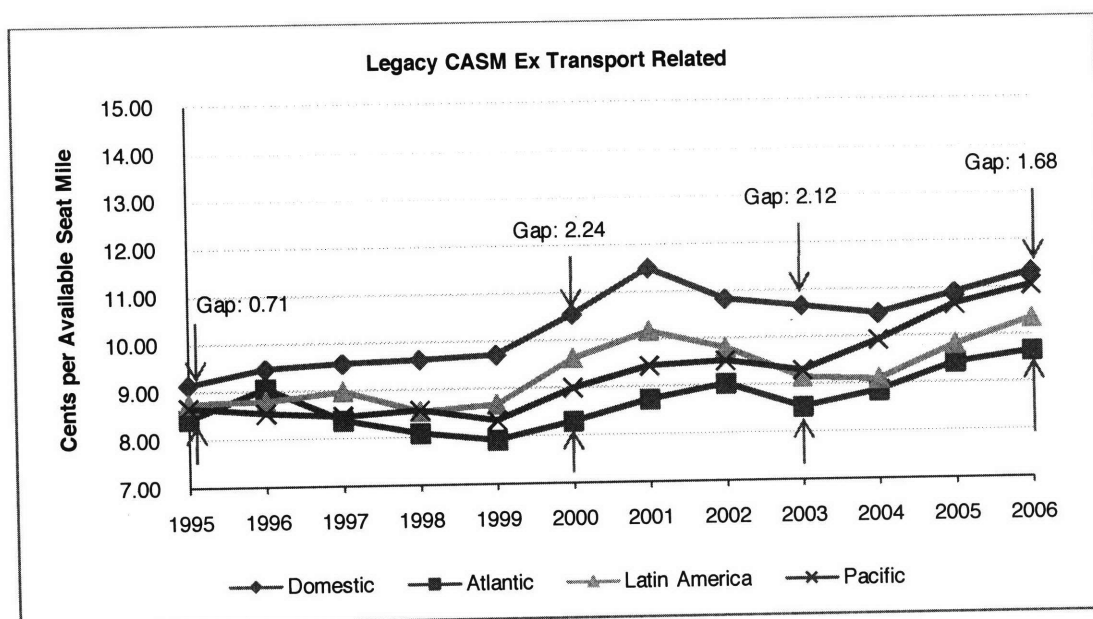


Figure 4-3: Legacy CASM without Transport Related Cost

However, note that the removal of transport related bias does not necessarily mean that region to region unit cost comparison becomes completely fair. This is due to the problem of cost allocation between the 4 entities. The expenses that the legacies pay to

domestic regional partners can be all considered domestic, if one takes the view that the payment displaces domestic capacity that the carriers otherwise have to produce. On the other hand, if the regional partner carries passengers that are connecting to international routes, then part of the expense can be viewed as international.

The difference in accounting methods can be deduced from some anomalies in the F41 data. From 2004 to 2006, Continental's Transport Related Expense for all international operations dropped to zero as shown in Figure 4-4, indicating that the airline probably changed the accounting method to classify all Transport Related Expenses as domestic. The same thing happened to US Airways + America West, where the international transport related expense was zero from 1998 to 2005, only to jump sharply in 2006 as indicated in Figure 4-5. Meanwhile, from Figure 4-6 it can be seen that American Airlines had identical Transport Related CASM for all 4 entities from 1999 to 2006, indicating that the airline had probably prorated the Transport Related Expenses to each entity according to ASMs.

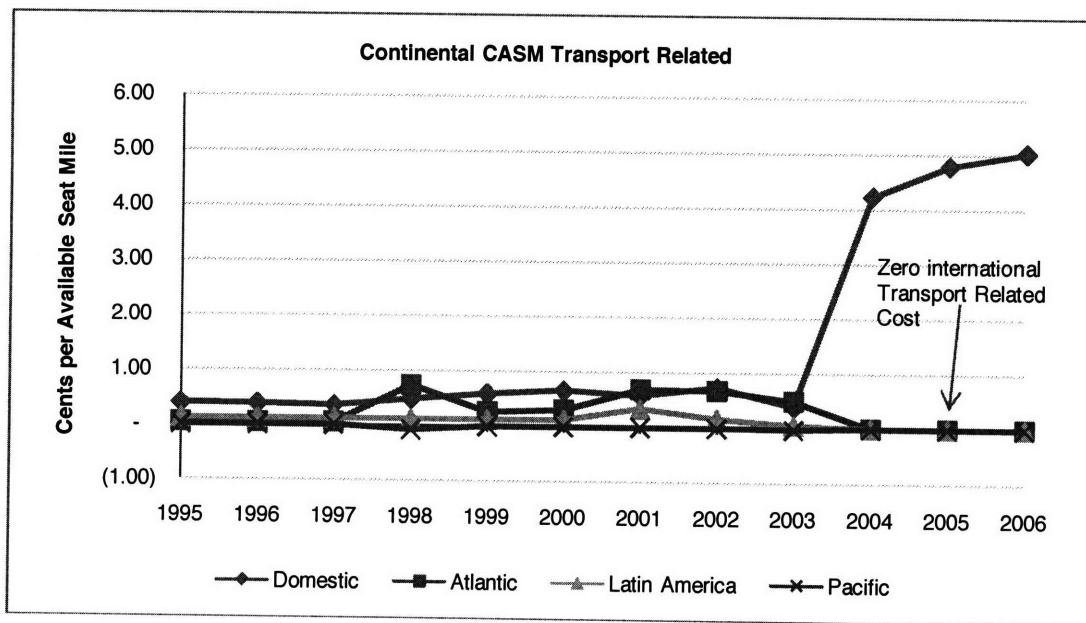


Figure 4-4: Continental Transport Related CASM

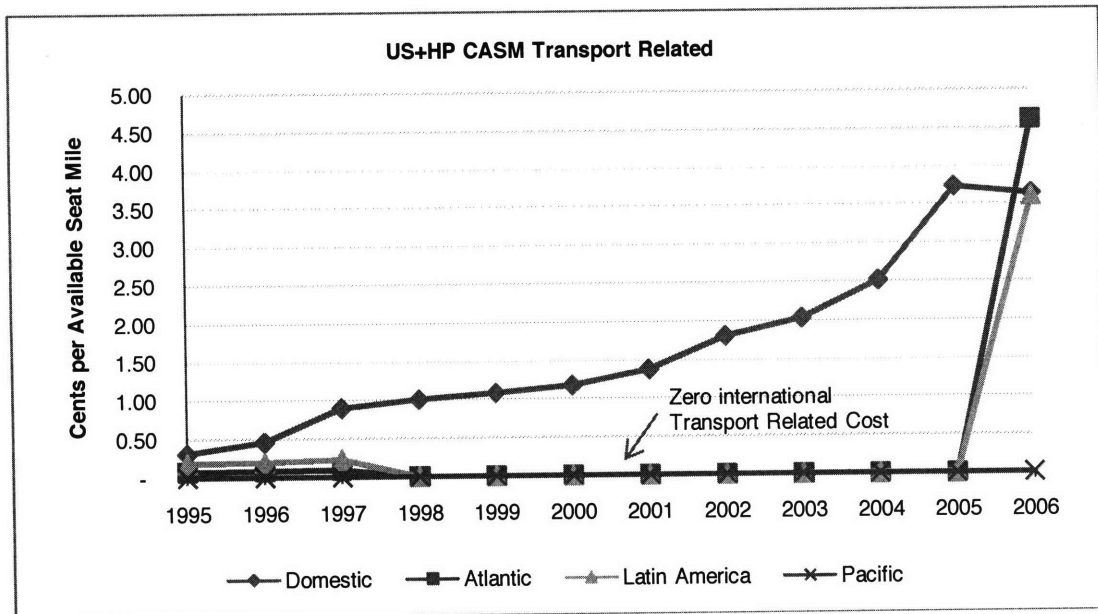


Figure 4-5: US Airways + America West Transport Related CASM

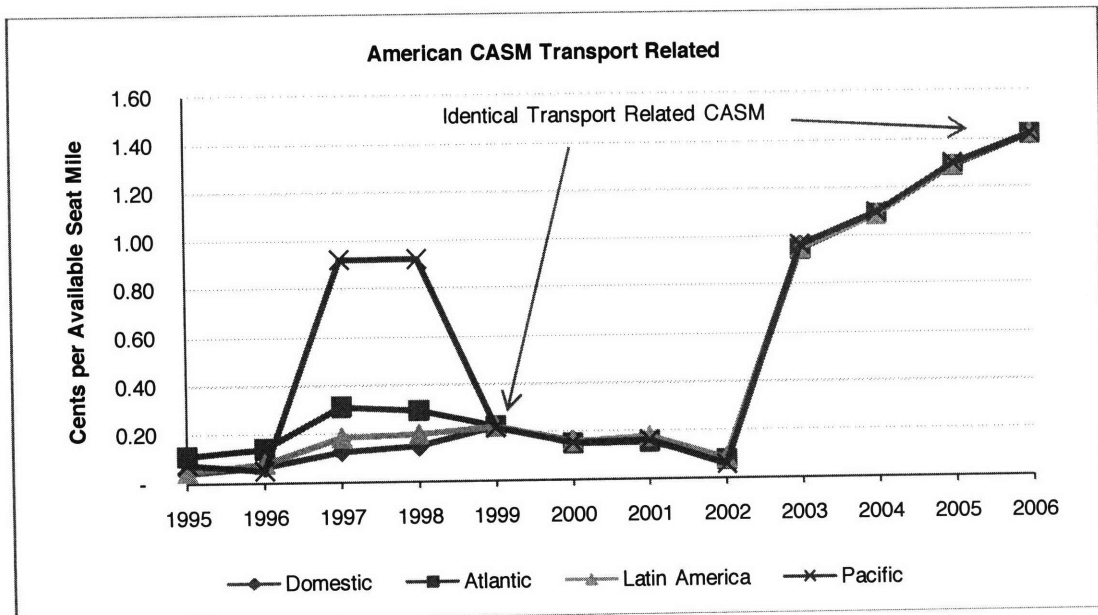


Figure 4-6: American Transport Related CASM

4.3 Fuel Costs

4.3.1 Rise of Fuel Costs

Fuel expense is one category of expense which can be allocated to each entity without any bias, because it takes into account the actual fuel loaded for each flight. As crude oil price increased dramatically in the past 5-6 years, so has jet fuel which is currently derived entirely from crude oil. For this reason, fuel expense had become more and more significant to airlines than ever before. Figure 4-7 shows the evolution of Fuel cost per ASM for legacies in the past decade. Since 2003, Fuel CASM for all regions had increased significantly. For Pacific operations, Fuel CASM grew 140% in the period 2003-2006, while for the other entities the increase was around 125%. For Legacies combined, fuel expense made up 13% of the total operating cost in 2003, and by 2006, this figure had risen to 24% of total operating cost.

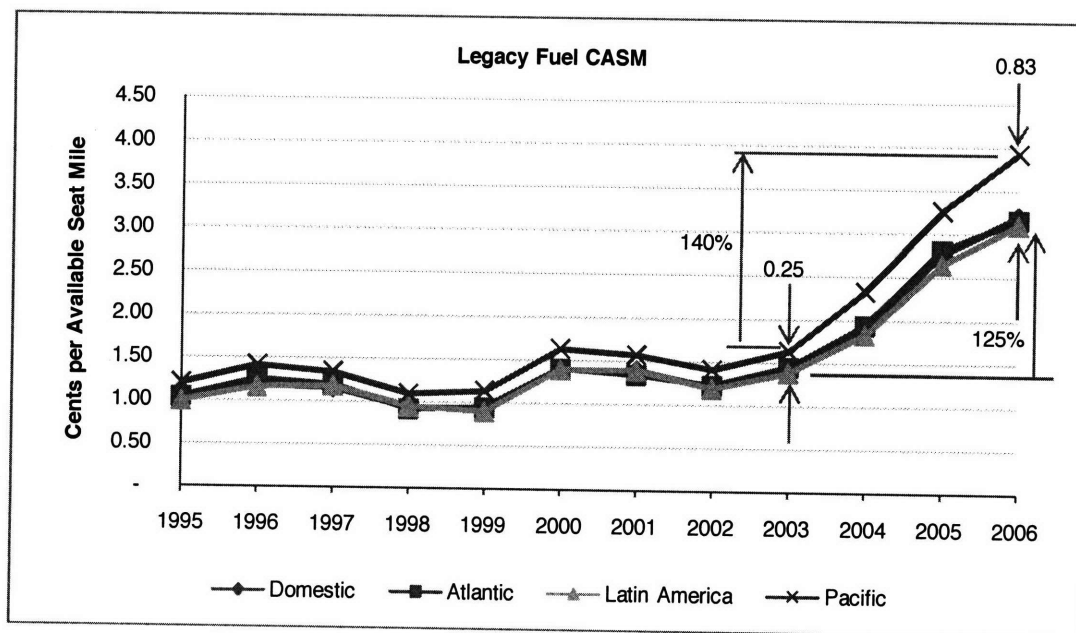


Figure 4-7: Legacy Fuel CASM

One interesting phenomena to note from Figure 4-7 is that Fuel CASM for Pacific operations was always a step higher than the rest of the world, and that gap widened since 2003, growing from 0.25 cents to 0.83 cents, which is further investigated in the next section. On the other hand, since fuel CASM is not higher in domestic operations than in other regions, the international shift that happened after 2003 should not be related to fuel cost.

4.3.2 Divergence of Pacific Fuel Costs

Here we will take a further look at what caused the divergence of fuel cost between Pacific operations and the other entities. Figure 4-8 shows the average gallons of fuel consumed per ASM in the four different regions for Legacy carriers from 1995 to 2006. It can be seen that fuel consumption per ASM is higher in Pacific operations since 1995, and this difference only became more pronounced from 2000 onwards, as the other 3 regions gained fuel efficiency while Pacific operations remained nearly the same. Domestic and Atlantic gallons per ASM decreased by 14% and 13% respectively, while Pacific gallons per ASM dropped by only 1%, showing that it is Pacific operation's lackluster improvement in fuel efficiency compared with the other 3 regions that led to its disproportional increase in fuel cost. There are several explanations for the comparatively lower fuel efficiency of Pacific operations.

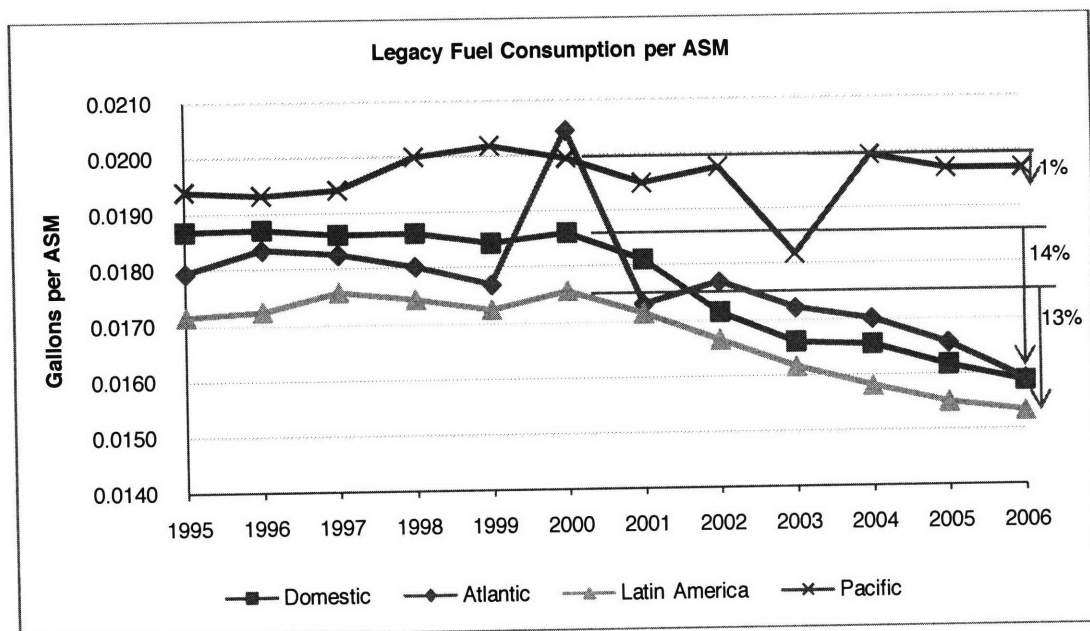


Figure 4-8: Legacy Fuel Consumption per ASM

Decrease of aircraft seat capacity

Because they involve ultra long haul transpacific flights, Pacific operations are more likely to have lower density premium cabins. In fact, since the early 2000, perhaps to better compete with foreign carriers, the main US operators in transpacific routes, namely Northwest Airlines and United Airlines, which make up a combined 78% of all Pacific capacity from US carriers in 2006, had been decreasing seat capacity on their

aircraft to create more space per passenger in their premium cabins. United, for example, introduced first class suites and “Economy Plus” on their aircraft, while Northwest introduced a new business class with increased seat pitch in 2003, all of them requiring the reduction of capacity on an aircraft.

Table 4-1 shows the comparison between actual data of detailed average seat capacity by aircraft type of first quarter 2000 vs. first quarter 2006 for the two airlines, it can be seen that all aircraft type saw a reduction of seats between 2000 and 2006, thus lowering the apparent fuel efficiency per ASM for these flights.

Table 4-1: Change in Seat Count on Airlines Dominating Pacific Capacity

Airline	Aircraft	2000	2006	Change
Northwest	747-400	417	402	-3%
Northwest	DC-10	281	273	-3%
Northwest	747-200	369	376	2%
United	747-400	365	347	-5%
United	777-200	286	258	-10%
United	767-300	206	193	-6%

On the other hand, in Atlantic operations, the other long haul market, where Continental Airlines, Delta Airlines and American Airlines make up 66% of total capacity offered by US carriers, average seat capacity of the each aircraft type increased instead. Table 4-2 shows the comparison of same aircraft type for the three airlines for first quarter 2000 vs. first quarter 2006, showing that apart from Delta’s Boeing 777-200s (which only make up 16% of Delta’s transatlantic capacity in 2006), most aircraft types have either increased their seat capacity or remained the same. The increase in seat count on the aircraft contributes to higher ASM offered, and thus a better fuel efficiency per ASM.

Table 4-2: Change in Seat Count on Airlines Dominating Atlantic Capacity

Airline	Aircraft	2000	2006	Change
Continental	777-200	283	283	0%
Continental	757-200	173	173	0%
Delta	767-300	193	200	3%
Delta	777-200	278	268	-4%
American	777-200	235	245	4%
American	767-300	202	214	6%

Lower rate of fleet renewal

Pacific operations also had a lower fleet renewal rate than the other markets. Here we compare the fleet composition of Pacific operations versus Atlantic operations, the other long haul market. Thus the purpose of this comparison, we have classified the aircraft types in these two markets into two groups. The first group is newer generation jets which in general are more fuel efficient, while the second group is the older generation jets with lower fuel efficiency in general:

- Newer Generation: 747-400, 777, 767, 757, A330
- Older Generation: 747-200, DC-10, MD-11

For practical purpose we chose a number of carriers in the comparison for both regions:

- Atlantic: American, Continental, Delta, Northwest, United. Together they make up 92% of Atlantic capacity in 2006.
- Pacific: American, Continental, Northwest, United. Together they make up 98% of Pacific capacity in 2006.

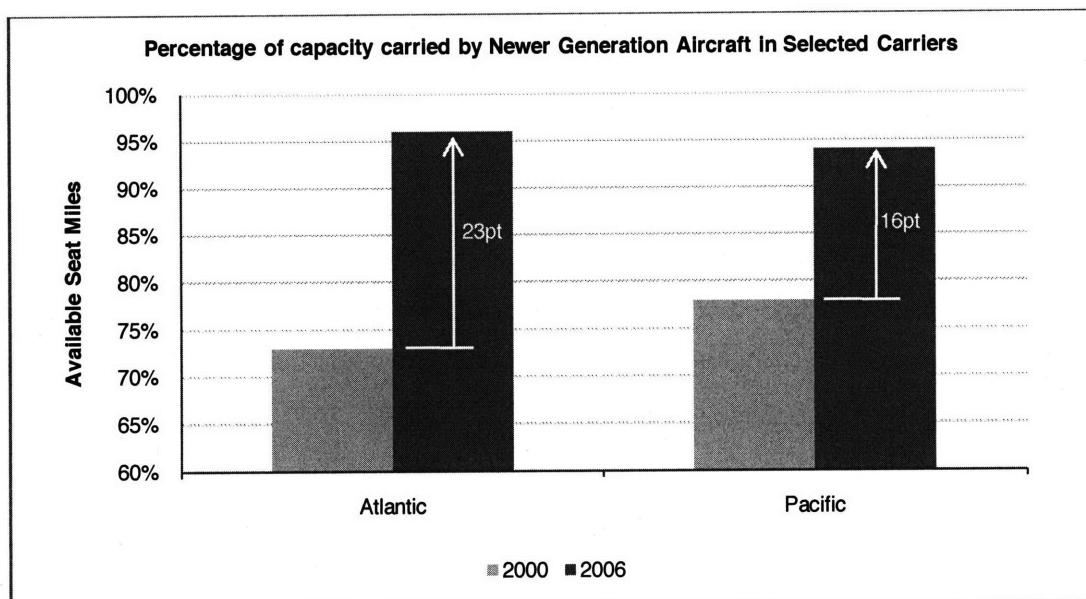


Figure 4-9: Comparison of Percentage Capacity carried by New Generation Aircraft

Figure 4-9 shows the percentage of capacity carried by newer generation aircraft for both regions in 2000 vs. 2006. Both regions shows increase in the use of newer generation aircraft. But the change is more aggressive in Atlantic operations, with a 23 point

increase (versus the 16 point increase in Pacific operations). This region saw the retirement of 2 types of aircraft from its operations: the A300, MD-11, and also the sharp decrease in old DC-10s from 17% to 3% (See Table 4-3). Meanwhile, for Pacific operations, classic Boeing 747-200 usage was down from 21% to 4%, while Boeing 777-200 usage went up from 14% to 37%.

Table 4-3: Capacity Share of Different Aircraft Type in Atlantic & Pacific Operations

Atlantic ASM Share			Pacific ASM Share		
Aircraft Type	2000	2006	Aircraft Type	2000	2006
747-400	1%	2%	747-400	64%	49%
757-200	2%	6%	777-200	14%	37%
767	38%	40%	DC-10	2%	2%
777-200	32%	39%	747-200	21%	4%
DC-10	17%	3%	A330	0%	6%
A300	3%	0%	757-200	0%	2%
A330	0%	9%			
MD-11	6%	0%			

4.4 CASM ex Transport Related & Fuel

For a fairer unit cost comparison, the component of fuel cost needs to be removed in addition to transport related cost. This is because depending on their hedging strategy, different airlines might have very different jet fuel cost especially in times of huge fluctuations of crude oil price. Though removing this bias is not exactly meaningful here for aggregated metrics, it would be very useful in the carrier by carrier comparison in the next section.

If we further remove the effect of fuel expense from the Ex Transport Related CASM to obtain the Ex Transport Related & Fuel CASM as shown in Figure 4-10, we can see that the rest of the cost had actually decreased since the early 2000s. Domestic Ex Trans & Fuel CASM was down 12% during 2003 to 2006, while for international regions, the drop was around 8%. This shows Legacies' success over the past few years to reduce other operating costs, despite the hike in fuel cost that muted the achievement. Note though the comparison of CASM between the different regions is still not absolutely fair because they are still subject to how different carriers allocate the shared cost between regions.

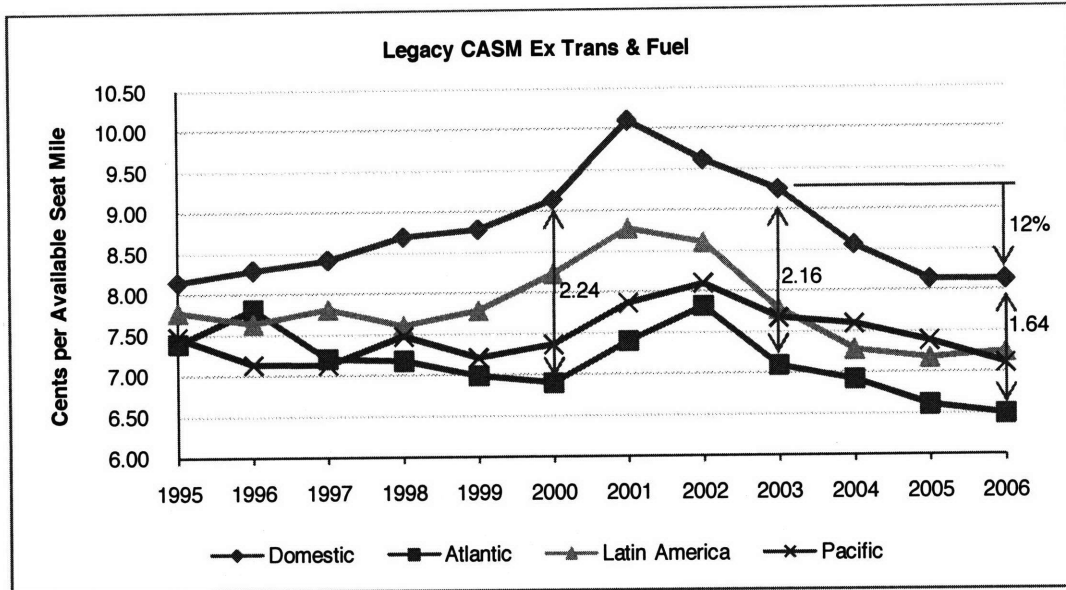


Figure 4-10: Legacy CASM without Transport Related & Fuel Costs

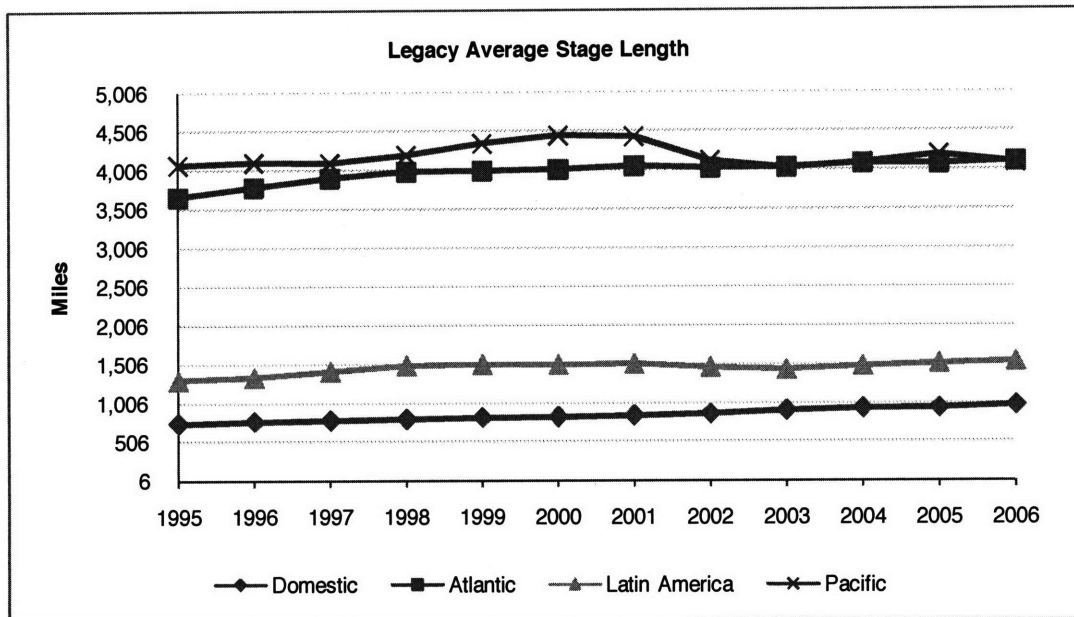


Figure 4-11: Average Stage Length for Different Entities

On the other hand, it can be observed that the theory that operations with longer average stage length has a lower unit cost does stand in Figure 4-10, in general. Average stage length for domestic operations, as shown in Figure 4-11, is the lowest among the four entities, and its unit cost was always the highest among all. Pacific and Atlantic operations has the longest stage length, and its unit cost is generally lower than Latin American and domestic operations.

To get a clearer picture of how the unit cost in international entities compares with domestic unit cost over the years, the three international entities were grouped together and plotted against domestic unit cost in Figure 4-12. It can be seen that international CASM excluding transport related cost and fuel cost has always been lower than its domestic counterpart. However a lower international unit cost does not mean it is more profitable since longer haul international operations also tend to have lower yields. Here we are interested in the evolution of difference between international and domestic unit costs, this is because holding other factors constant, a change in this difference leads to a relative change of profitability between the two entities. For example, if the gap widens, it means that international unit cost is getting lower and further away from domestic unit cost and hence a relative improvement in international profitability, and vice versa.

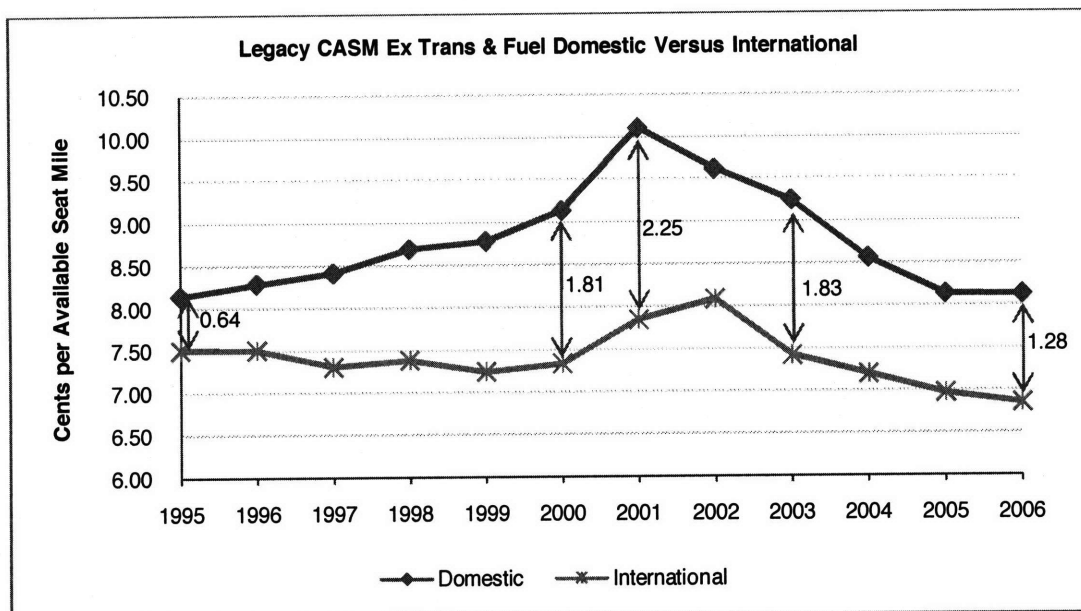


Figure 4-12: Domestic vs. International CASM without Transport Related and Fuel

Shown on Figure 4-12 is a changing gap between international and domestic CASM Ex Transport Related & Fuel. It was smallest in 1995 at 0.64 cents, widened gradually and peaked at 2.25 cents in 2001. It then converged again and narrowed down to 1.28 cents in 2006. Since the Ex Transport Related & Fuel CASM had been converging during the few years before and after 2003, there does not seem to be an overwhelming reason in the cost perspective for the shift to occur since 2003. In fact, with the Ex Transport Related & Fuel CASM converging since 2001, the profitability of international operations should have declined relatively if all other factors are held constant. Of course, the airlines might have been responding to the divergence of cost earlier from 1995 to 2001, but in such a competitive business environment where good and updated data sources are

abundant, the possibility of that seems low. Given that, there are two possible explanations for the international shift- one is that the allocation of cost among different entities in the F41 data does not reflect the reality; the other is that changes in the revenue side have made the case for international operations. Regarding the first explanation, there is little that can be done about, but for the second explanation, we shall investigate that in Chapter 5.

4.5 Individual Carrier Comparison

In this section we take a look at how the unit costs for different entities have evolved for each individual legacy carrier. We first present an overall comparison among different carriers in Subsection 4.5.1, after which, from Subsection 4.5.2 onwards there is a brief discussion on each of the six legacy carriers.

4.5.1 Unit Cost Comparison among Legacy Carriers

In this section we take a look at how the unit cost for different entities has evolved for each individual carrier. For carrier by carrier comparison, it is crucial to exclude Transport Related expense and Fuel expense from the unit cost because different carriers might have very different levels of regional outsourcing which can distort the figure, and different fuel hedging strategy for each carrier can give rise to immensely varying effective price of fuel, especially with the volatile crude oil prices in recent years. Thus the CASM Ex Transport Related Cost & Fuel Cost is used in these comparisons.

Table 4-4: Domestic and International CASM ex Transport Related & Fuel

Domestic CASM in Cents				International CASM in Cents			
	2000	2003	2006		2000	2003	2006
AA	9.08	9.55	7.92	AA	8.69	7.63	7.67
CO	9.22	8.98	8.87	CO	6.18	5.89	5.85
DL	8.43	9.46	8.21	DL	6.46	7.98	5.82
NW	8.72	9.55	8.60	NW	7.27	7.66	7.31
UA	9.47	8.63	7.77	UA	7.36	7.86	7.14
US+HP	9.99	9.18	7.89	US+HP	6.62	6.46	6.95

Table 4-4 summarizes the international and domestic CASM Ex Transport Related & Fuel for all six legacy carriers in 2000, 2003 and 2006. For all carriers, international Ex Transport Related & Fuel CASM was always lower than its domestic counterpart. Again, we are interested to see how the gap between them has changed, which is shown in Figure 4-13. Three of the carriers, American, Continental and Northwest had the gap increase during the period, which supposedly means an increasingly favorable environment for international operations, and can help explain why both American and Continental underwent aggressive international expansion after 2003. However, divergence in unit cost is also found for Northwest Airlines, the carrier with the least international expansion, while Delta, which had the most aggressive international expansion out of the six, has in contrary a converging cost gap during 2000 to 2003. This suggests that cost alone cannot explain the legacy carriers' strategy for international shift after 2003.

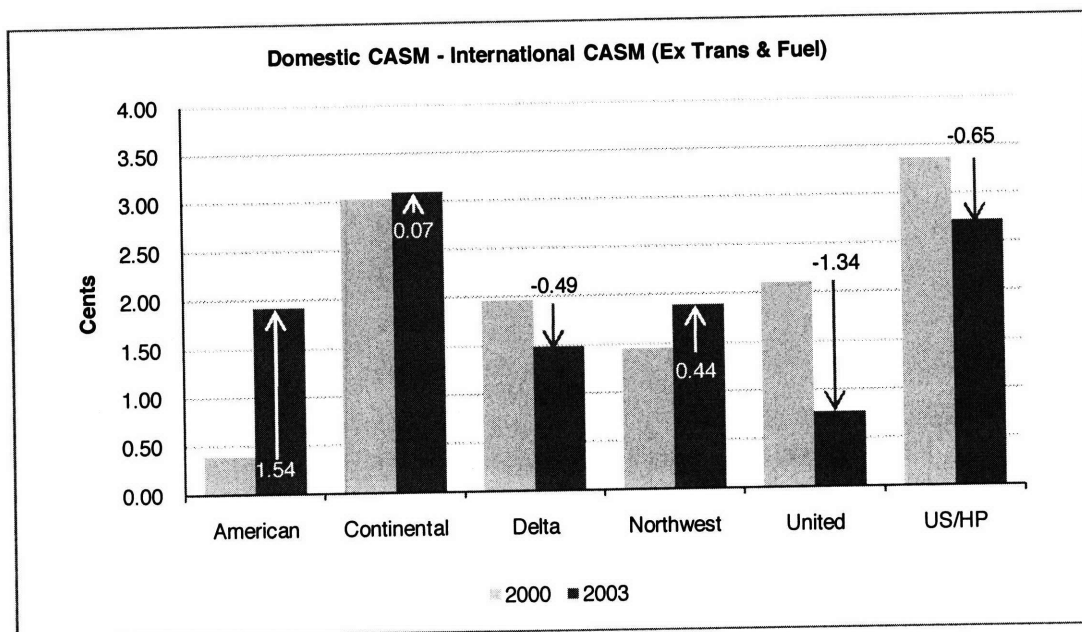


Figure 4-13: Difference between Domestic & International CASM 2000-2003

Figure 4-14 shows the gap between domestic and international CASM Ex Transport Related Cost & Fuel Cost for the six carriers in 2003 and 2006. From Figure 4-12 in the previous section it was seen that for legacy carriers combined, the gap has narrowed by 0.55 cents from 2003 to 2006. Here it can be seen that for American Airlines and US Airways/America West, the gap has narrowed significantly, with American's cost gap at a mere 0.25 cents in 2006, making the international cost only 3% lower than the domestic counter-part. Northwest Airline's cost gap has also narrowed, by 0.6 cents.

Both Continental Airlines and United Airlines had their cost cap staying nearly the same, dropping by a mere 0.07 cents and 0.14 cents respectively. With most carriers having a converging unit cost between domestic and international, it seems that rapid international expansion did not help reduce international operating cost relatively. This might be due to fact that, for operations within the United States, international flights share resources with domestic flights, giving no specific benefit of expansion to the international entity. But overseas, the increasingly weak US Dollar makes resources a lot more expensive when translated to USD, thereby increasing the international operating cost relatively.

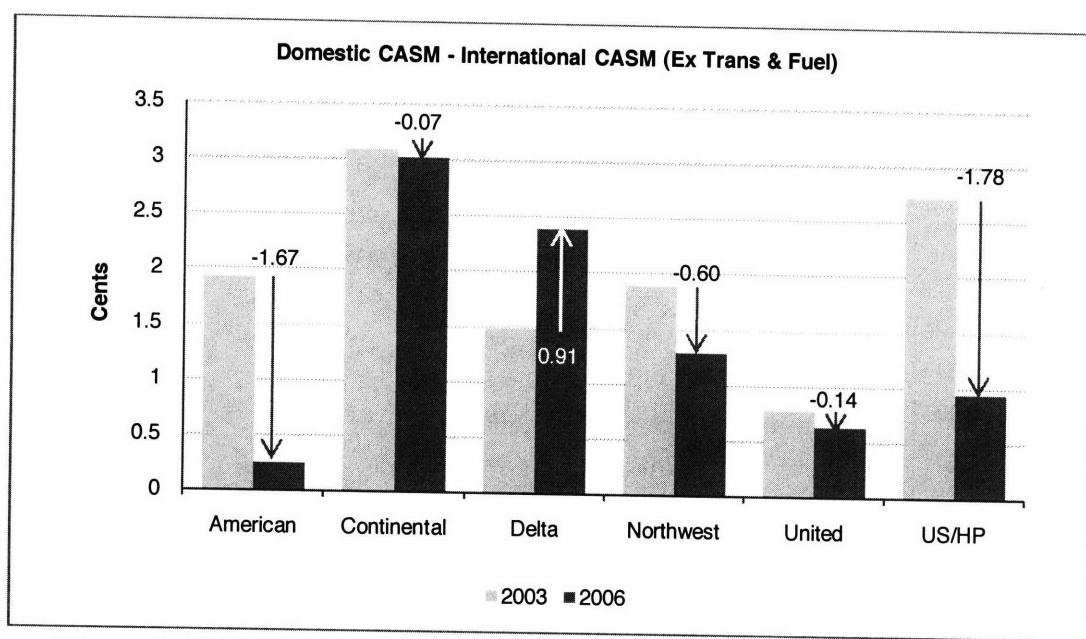


Figure 4-14: Difference between Domestic & International CASM 2003-2006

4.5.2 American Airlines

American Airline's evolution of domestic and international Ex Transport Related & Fuel CASM is one that best fit the theory of shift in capacity resulting from change in cost environment. As shown in Figure 4-15, the unit cost gap between domestic and international widened from 0.38 cents in 2000 to 1.92 cents in 2003, setting the stage for international expansion. On a side note American's domestic and international Ex Transport Related & Fuel CASM is closer to each other than that of all other carriers, and from 1996 to 1999 the international one is even higher than domestic, which is unusual as longer haul international flights typically has a lower unit cost than domestic

operations. It is probable that American Airlines has a different system of cost allocation between the different entities from other carriers.

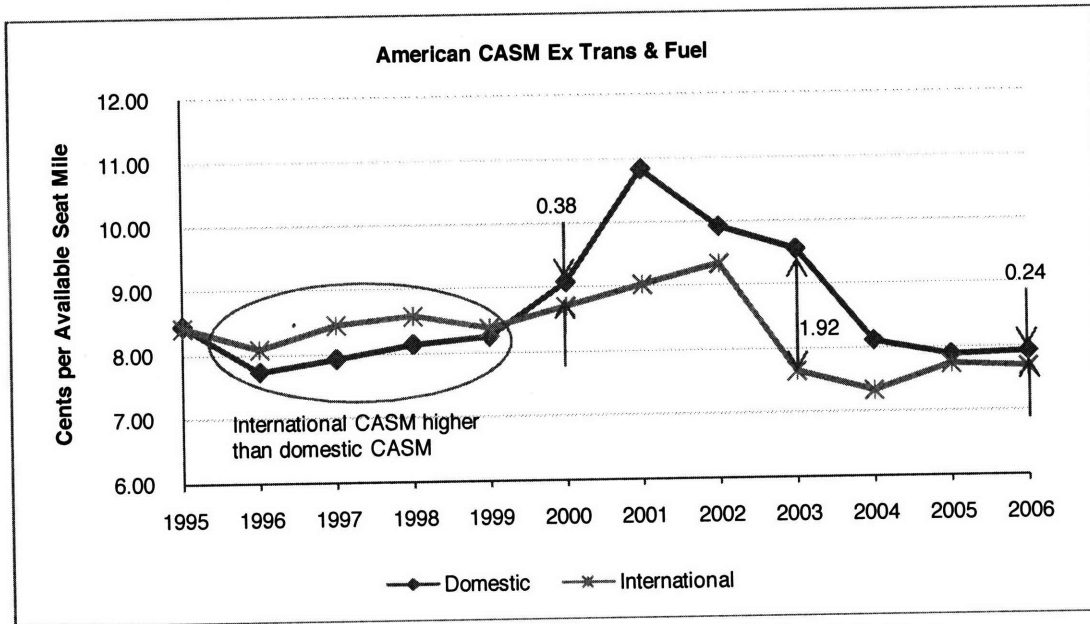


Figure 4-15: American CASM ex Transport Related & Fuel

4.5.3 Continental Airlines

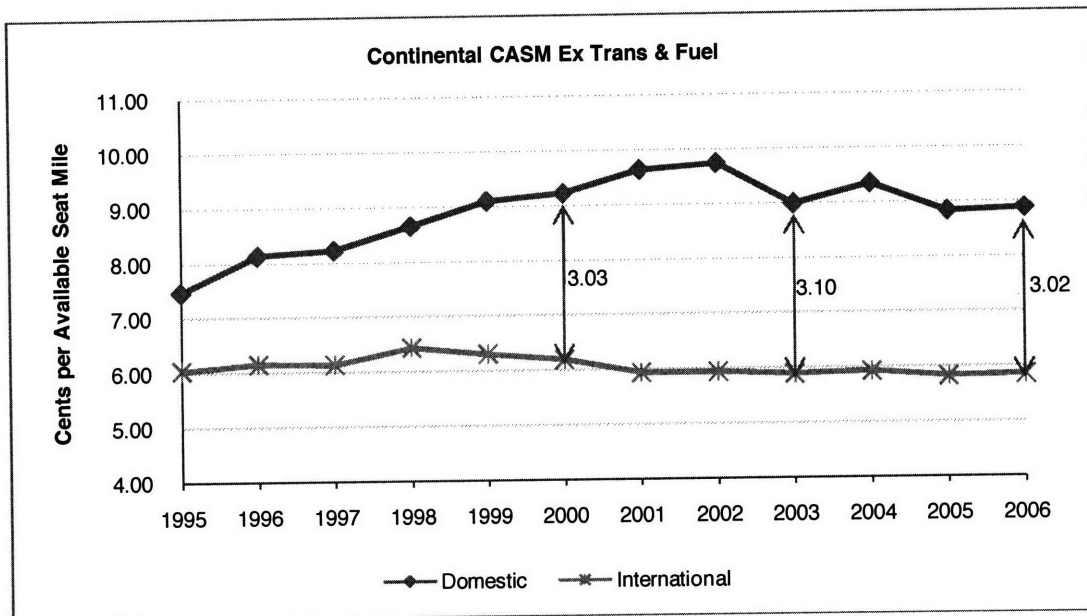


Figure 4-16: Continental CASM ex Transport Related & Fuel

Continental's difference between domestic and international Ex Transport Related & Fuel CASM was relatively stable from 2000 to 2006, with small fluctuations between 3.0

cents and 3.8 cents, which did not indicate particular reasons for aggressive international growth from 2003 to 2006 in the cost perspective. On the other hand, Continental's international CASM Ex Transport Related & Fuel is significantly lower than its domestic counterpart when compared with other carriers. This might have been a good reason for moving abroad, but might also be just a difference in cost allocation scheme used by Continental.

4.5.4 Delta Airlines

Delta Airlines shows a different behavior than all the other carriers. Its gap between domestic and international unit costs actually increased significantly from 2003 to 2006, by 0.91 cents. From Figure 4-17 which compares Delta's domestic and international unit cost, it can be seen that this divergence is mainly due to the sudden increase in domestic unit cost of 0.25 cents in 2006, which broke the downward trend happening since 2003. Delta was the most aggressive carrier out of the six in its shift from domestic operations to international operations from 2003 to 2006, and looking at Figure 3-25 in Chapter 4, it can be seen that there was an abrupt 16% drop in domestic ASM in 2006. Thus the rise in domestic CASM might be due to the cost structure not being able to decrease in line with the sudden drop in ASM.

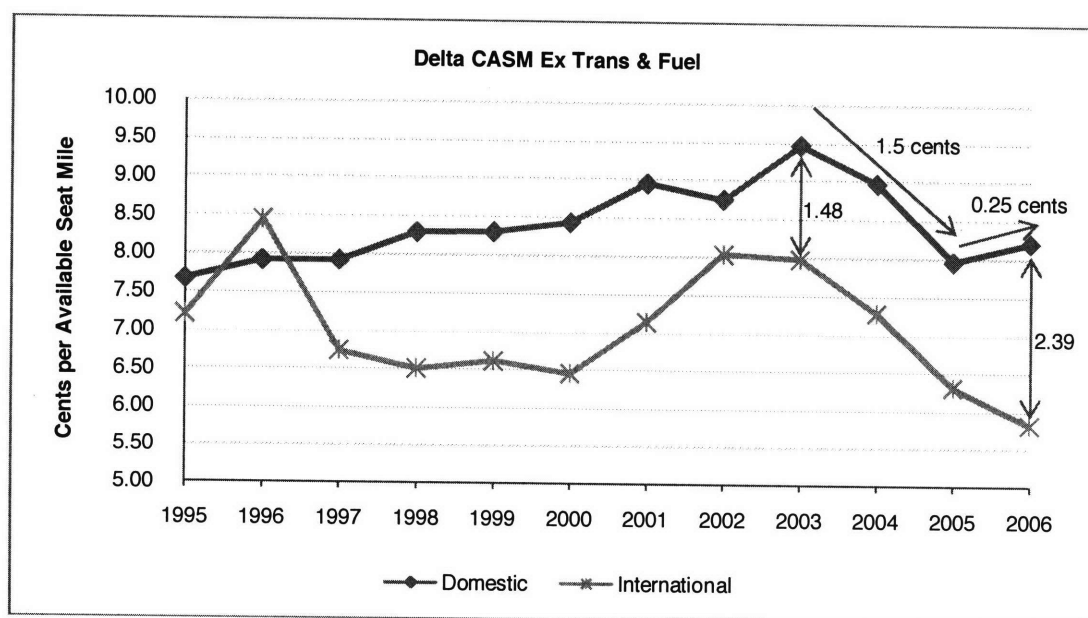


Figure 4-17: Delta CASM ex Transport Related & Fuel

One other interesting event in Delta's unit cost is the sudden spike of Pacific Ex Transport Related & Fuel CASM in 2002 and 2003, which increased by 83% as shown in Figure 4-18. As shown previously in Figure 3-27 of Chapter 3, Delta nearly dropped all its Pacific routes since 2002, thus this spike might be the result of not being able to pull resources out of Pacific operations sufficiently quickly.

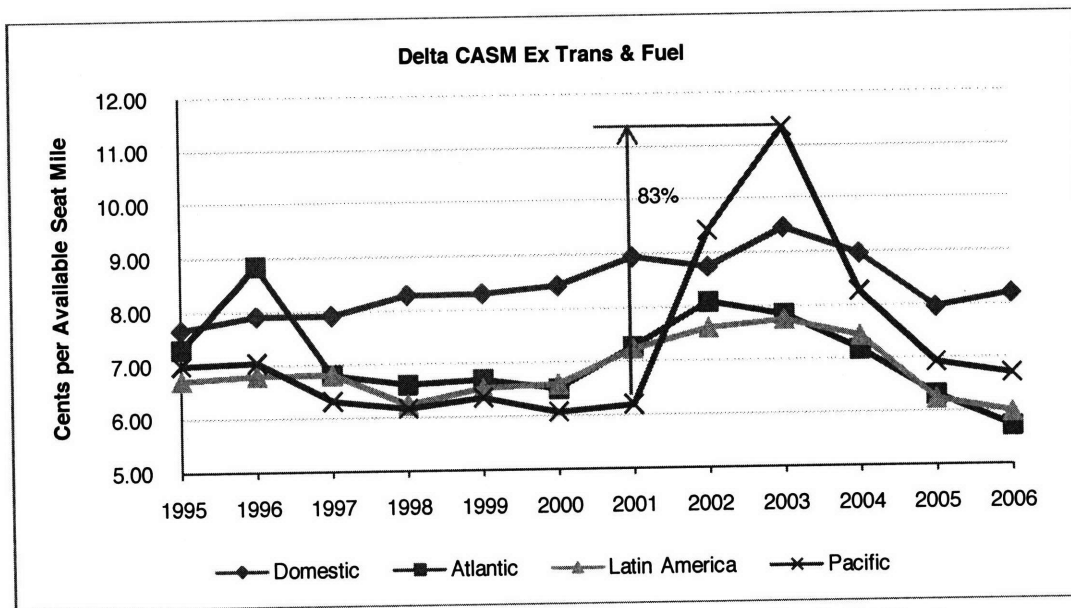


Figure 4-18: Delta CASM ex Transport Related & Fuel All Regions

4.5.5 Northwest Airlines

Northwest Airlines shows different unit cost behavior in its Pacific operations from its domestic and Atlantic operations. From 2003 to 2006, while the unit cost of domestic and Atlantic operations decreased by 10% and 16% respectively, Pacific unit cost increased by 1%, as shown in Figure 4-19. Looking at Northwest's average stage length in Figure 4-20, it can be seen that Pacific average stage length decreased since 1998 relative to that of Atlantic and domestic operations. Northwest Airlines has a huge in Japan where it operates short haul flights within Asia, thus it is likely that the decrease in average stage length is a result of increased share of intra-Asian flying in its Pacific network, which lowered the Pacific average stage length, and as a result causing the Pacific unit cost to rise relative to the other entities.

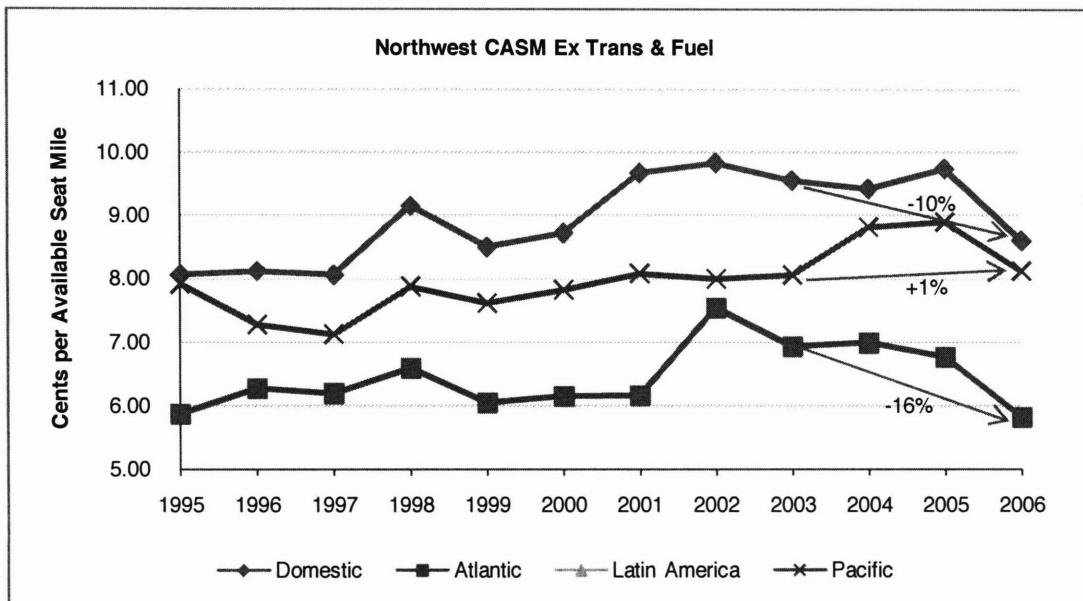


Figure 4-19: Northwest Airlines CASM ex Transport Related & Fuel

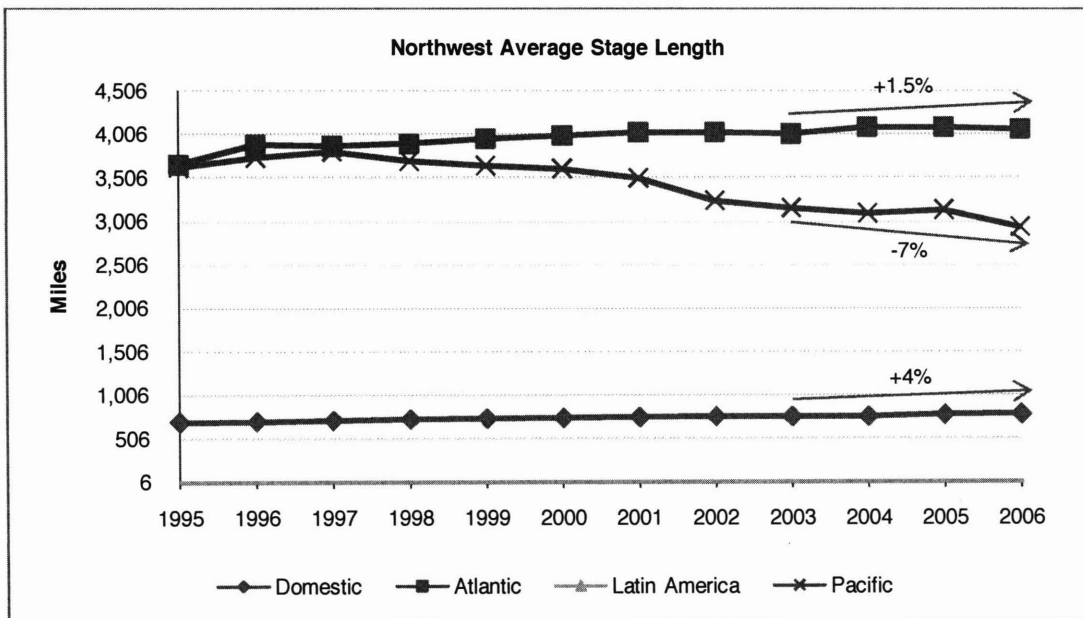


Figure 4-20: Northwest Airlines Average Stage Length

In terms of the difference between international and domestic Ex Transport Related CASM, Northwest showed slight divergence from 2000 to 2001, and had been converging very slowly after then, as shown in Figure 4-21. On the other hand, the dramatic decrease in unit cost from 2005 to 2006 shows the success of its restructuring after it filed for bankruptcy protection in 2005.

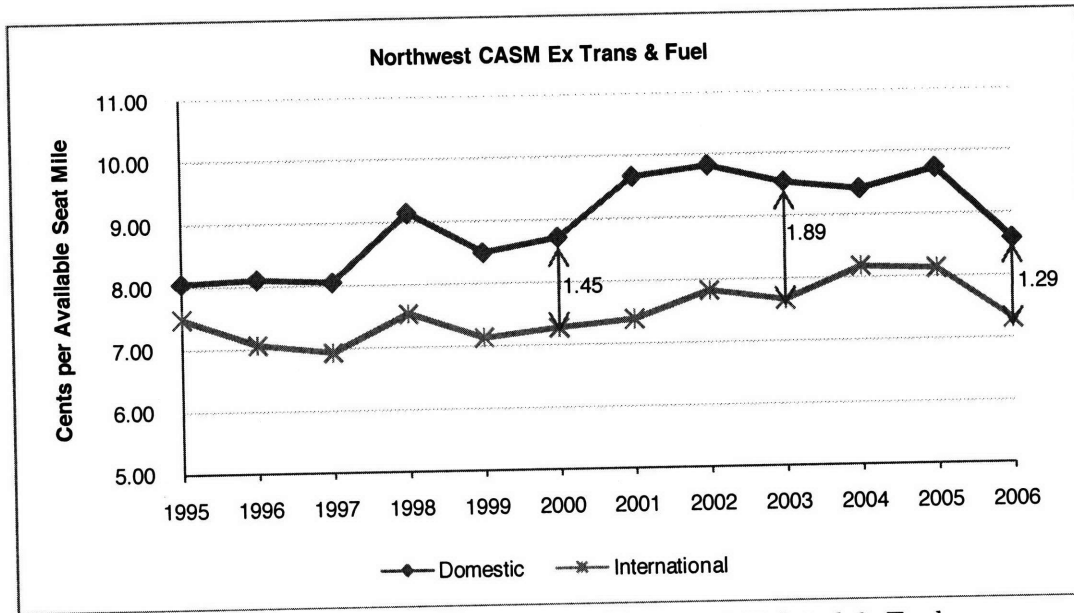


Figure 4-21: Northwest CASM ex Transport Related & Fuel

4.5.6 United Airlines

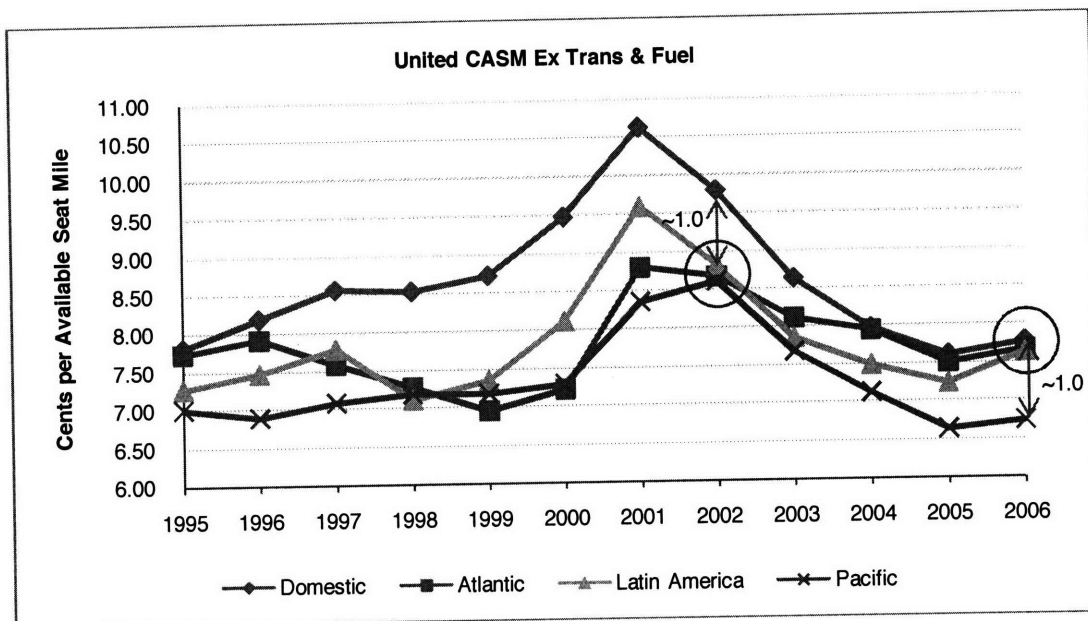


Figure 4-22: United CASM ex Transport Related & Fuel for All Regions

United Airlines also shows an interesting behavior in its international unit cost. Atlantic and Latin American unit cost has come closer to the domestic unit cost since 2005, which was originally significantly higher. From Figure 4-22 it can be seen that domestic unit cost was around 1 cent higher than each of the international entities in 2002, after which the Atlantic and Latin American unit cost climbed towards domestic unit cost,

while Pacific unit cost maintained a similar distance of around 1 cent below domestic. In 2006, domestic, Atlantic and Latin America have very similar unit cost at around 7.6 cents, roughly 1 cent higher than Pacific unit cost.

Changes in cost environment does not seem to explain why United shifted capacity internationally. As shown in Figure 4-23, the gap in Ex Transport Related & Fuel CASM converged from 2.11 cents in 2000 to 0.77 cents in 2003, indicating better improvement in domestic cost efficiency. Note the dramatic decrease in unit cost for both domestic and international operations from 2001 to 2005, demonstrating the success of its restructuring efforts during the bankruptcy protection from 2002 to 2006.

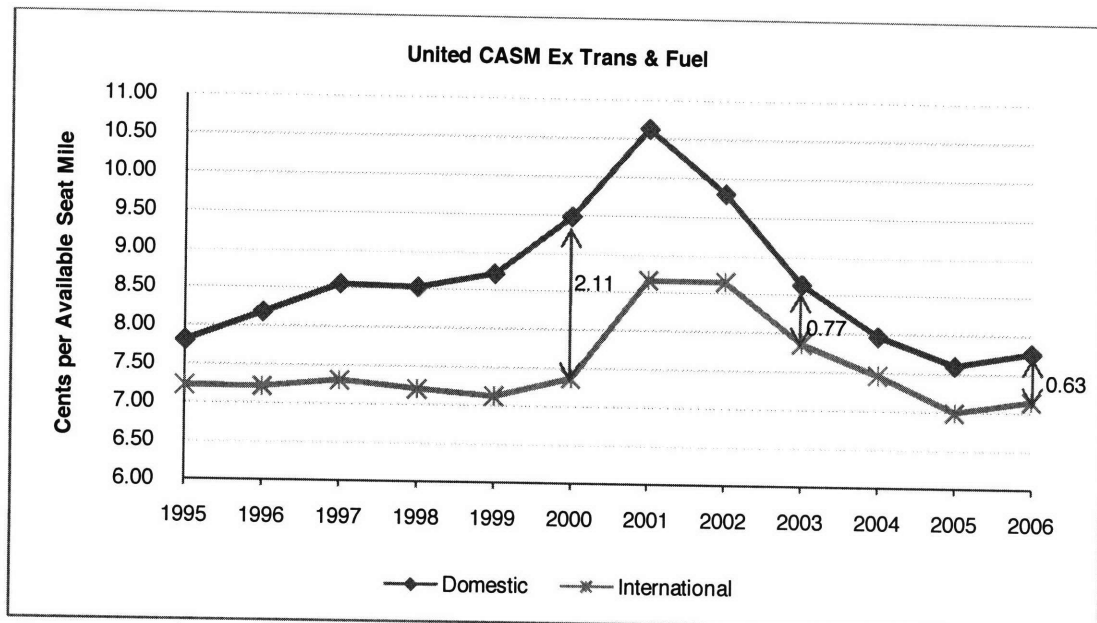


Figure 4-23: United CASM ex Transport Related & Fuel Domestic vs. International

4.5.7 US Airways + America West

The difference between US+HP's international and domestic Ex Transport Related & Fuel CASM was at one time among the highest in the legacy carriers, as shown in Figure 4-24, with a gap of 3.37 in 2000, only to reduce to 2.72 in 2003, which does not seem favorable to international operation, and might be part of the reason the carrier underwent the one of the lowest international shift from 2003 to 2006. On the other hand, the abrupt close in the gap from 2005-2006 which resulted in a mere 0.94 cents difference between international and domestic Ex Transport Related & Fuel CASM

could have been the results of the merger, which might have complicated the reporting of data for different entities.

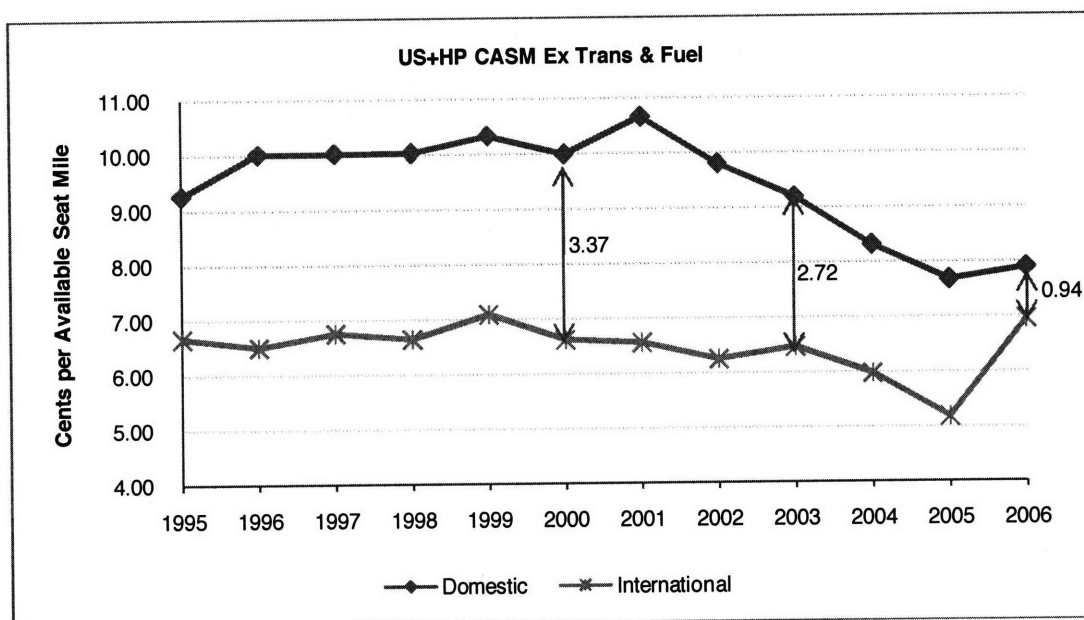


Figure 4-24: US+HP CASM ex Transport Related & Fuel

4.6 Chapter Summary

Total CASM for the four different regions of operations, as reported by the airlines, have diverged over the past 5 years, with the domestic CASM rising faster than the international operations. The drastic increase in the reported domestic CASM is due mainly to the strong outsourcing of flying to regional carriers in domestic operations, resulting in lower mainline ASM count and thus a seemingly higher CASM.

Fuel CASM went up dramatically for all regions in the since 2003 due to the increase in Jet fuel cost. The rise is especially significant for Pacific operations, the reason being the combination of the general reduction of seats on transpacific aircraft and the slower fleet modernization of Pacific flights when compared with other regions.

As measured in CASM ex Transport Related and Fuel Cost, unit cost is always lower in international operations due to its higher stage length. On average the unit cost gap between domestic and international operations decreased since 2001, and does not seem to favor international operations, which suggests that there might be other factors in

place that led to the legacy carrier's significant international shift that happened from 2003 to 2006.

In the next chapter we will perform an analysis on passenger revenue generation in the different entities, which when compared with the analysis of cost, can give a clearer picture of the profitability in different regions of operations.

Chapter 5

Revenues and Profitability

In the previous chapter we looked at how the unit cost has evolved for the different entities. The gap between domestic and international CASM Ex Transport Related & Fuel had been converging in the few years before and after 2003, with the international unit cost getting closer to the higher domestic unit cost, which seemingly makes international operations becoming less favorable when compared with domestic operations, and does not help explain why most airlines have been actively shifting capacity to international operations since 2003.

In this chapter we will perform an analysis of revenues and profitability in order to put the pieces of puzzles together and find out the reasons behind the international shift after 2003. The aim is to see whether the revenue picture is better for international operations, and to compare the unit revenue with unit cost to see how the relative economics of the different entities have evolved that lead to the shift.

Section 5.1 of this chapter deals with legacy carriers' aggregate evolution of unit revenue. After that Section 5.2 presents a detailed comparison of yield among different regions, with average length of haul considered, while Section 5.3 looks into the profitability of different entities. Section 5.4 then gives detailed individual carrier comparison, followed by a summary of findings in Section 5.5.

5.1 Unit Passenger Revenue

We first take a look at the evolution of revenue per unit capacity of the different entities, which is the revenue per available seat mile, or RASM. Throughout the chapter we will only use the passenger revenue in the calculation because we are focusing on the legacy carrier's core business of passenger transportation. Using only the revenue from ticket sales also avoids the effects of extraordinary revenue from other economic activities or transactions which might bias the comparison.

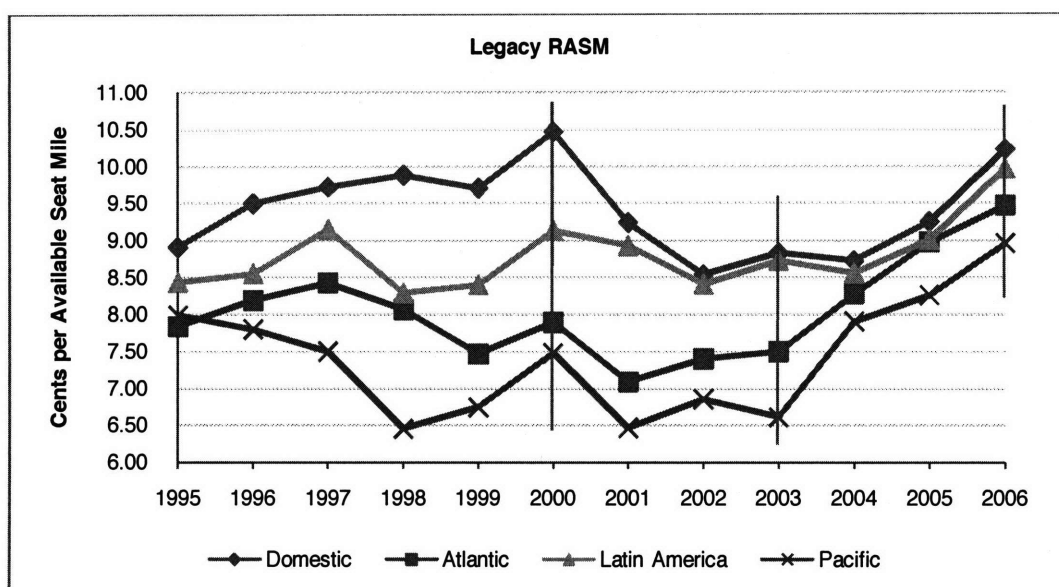


Figure 5-1: Legacy RASM from 1995 to 2006

Figure 5-1 shows the evolution of RASM for the four entities from 1995 to 2006. It can be seen that the theory that higher stage length leads to lower RASM generally holds true, with domestic operations having the highest RASM while Pacific operations which has the highest average stage length has the lowest RASM. A peak appears in 2000 for all regions followed by a fall, probably due to the economy recession in the early 2000s, but since 2003 all regions showed strong growth in RASM probably because of the economic recovery.

Domestic RASM dropped the most during the early 2000s, falling by 18% in just two years from 2000 to 2002. A convergence can be seen between domestic RASM and international RASMs after 2000, with the international figure getting up closer to the domestic figure. Table 5-1 summarizes the change in RASM for all four entities for the period 2000-2003 and 2003-2006. Domestic RASM suffered the greatest fall of 16% out of

all four entities from 2000 to 2003, while for the recovery from 2003 to 2006, domestic RASM rose the second lowest, with a growth of 16% which is far below the Atlantic and Pacific figures of 26% and 36% respectively.

Table 5-1: Percentage Change in RASM

	2000 to 2003	2003 to 2006
Domestic	-16%	16%
Atlantic	-5%	26%
Latin	-4%	14%
Pacific	-12%	36%

For a clearer contrast between domestic and international Operations, the data for the three international regions were grouped together in Figure 5-2. As expected, the international RASM was always lower than domestic RASM, allowing us to focus on the gap between the two. It can be seen that the RASM gap reached its maximum of 2.44 cents in 2000 and then reduced afterward to 1.28 cents in 2003, reaching the closest of a mere 0.47 cents in 2005 and increasing again to 0.77 cents in 2006.

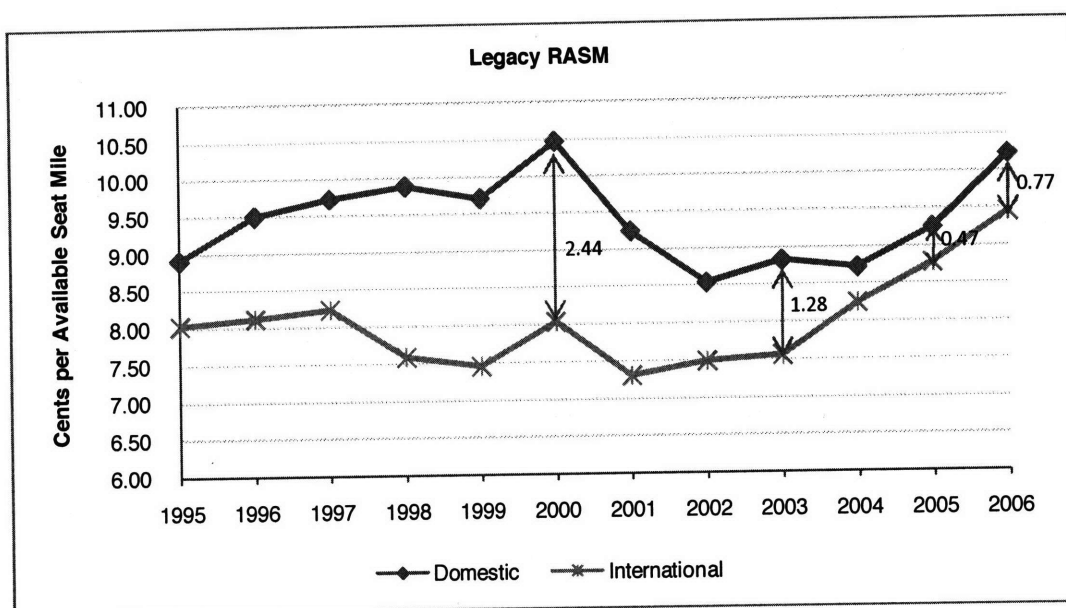


Figure 5-2: Legacy RASM Domestic vs. International

The fast convergence of RASM in the period 2000 to 2003 highlights the worsening of domestic revenue stream at that time relative to the international operations, and is probably one of the driving factors that lead to the airline's aggressive shift towards higher proportion of international operations. The widening of the RASM gap from 2005 to 2006, whereby the domestic RASM increased more than international RASM, might

be a result of the combination of decreased domestic supply, which pushes up air fares, and the increased international supply, which can pull down air fare relatively.

5.2 Yield vs. Average Haul

It is well understood that average stage length has a great effect on unit revenue. Longer flights generally have lower unit revenue than shorter flights. Thus international operations, which generally have a higher average stage length because of the distance from foreign countries, would have in general lower unit revenue, which is clearly shown in the previous section. Therefore, without taking the average stage length into account, it is hard compare the performance of revenue generation between domestic operations and international operations. Thus in order to make a valid comparison between them, a detailed relationship between unit revenue and average length of haul has to be established, such that the effects of the average length of haul can be isolated.

The DB1B database from the Department of Transportation provides detailed market level data for domestic markets, which includes 10% sampled average length of haul and average yield data for all markets. (RASM is not applicable because different markets can share the same flight inventory). We can thus make use of the data and plot yield against average haul to understand the relationship between the two.

Ideally we should also plot the same curve for international operations, and in fact, such data do exist in the Department of Transportation. However, the international market data is confidential and thus not available for published analysis. Thus we will use the system-wide aggregate data point for the international entities, and see where they land on the graph compared with the domestic yield curve.

We first take a look at the aggregate legacies average yield vs. average haul relationship in the first quarter of 2003, as shown plotted in Figure 5-3, where the top 1000 domestic markets in terms of passenger numbers were used. The reason why 2003 is chosen here is because the aggressive shift to international operations started after 2003, and therefore the data or driving force behind the shift must have been seen before the shift occurred.

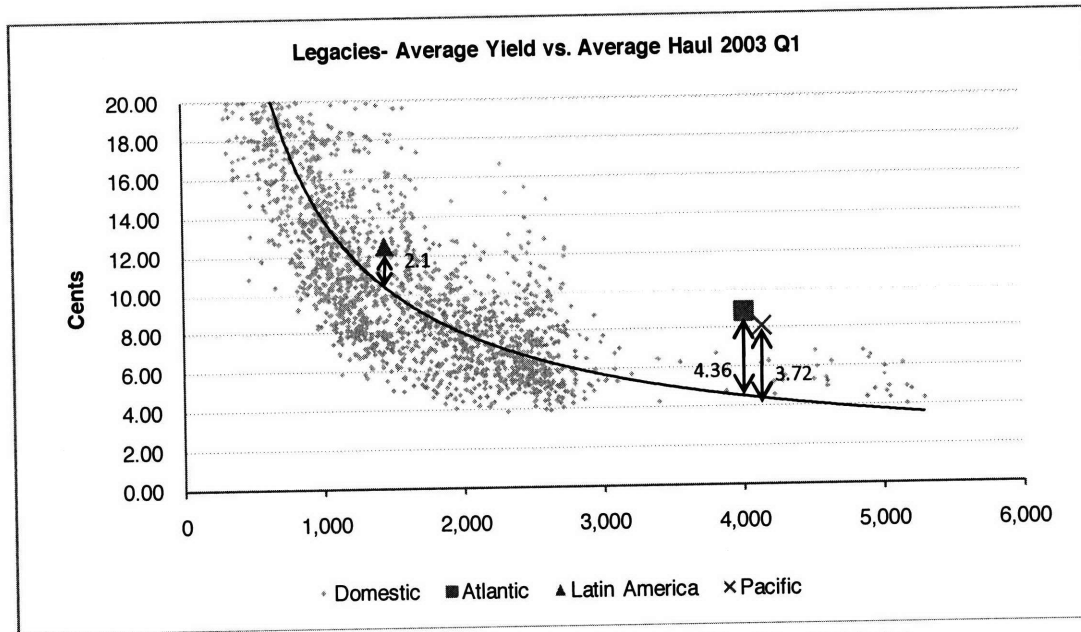


Figure 5-3: Legacies Yield vs. Average Haul in 2003 Q1

From the figure, the domestic data points form a power law shaped curve cluster, while the data points for international operations falls in towards the upper end of the cluster in its respective stage length. A power law trend line was added so that a quantitative comparison can be made, and it can be seen that the international data points are all above the trend line, meaning that on average, for the same average length of haul, the yields are higher in international markets than in domestic markets.

The distances between the international yield points are 4.36cents, 2.1cents and 3.72 cents for Atlantic, Latin American and Pacific operations respectively. Latin American average yield is the closest to the domestic fitted curve, and this is probably due to the presence of LCCs in the Latin American markets which can drive down the average ticket prices. Parts of Latin America are of close proximity to continental USA, which allows LCCs to operate easily with their short haul equipment. On the other hand, Trans-Atlantic and Trans-Pacific operations are of too great a distance for the LCCs to operate economically on with their short haul equipment, leaving the market to the legacies themselves, which is one factor that leads to a higher average yield.

However, it can be seen that the power law fitted curve does not land at the center of the data points at higher average hauls due to the influence of other data points in other parts of the curve, which exaggerated the distance of Atlantic and Pacific yield points from that of the domestic level with comparable length of haul. Nonetheless, the Atlantic

and Pacific yields are still 2.2 cents and 1.8 cents above the highest domestic yield around in similar length of haul. Adding to the fact that Atlantic and Pacific load factors are generally higher than that of the domestic flights (see Figure 3-10: Legacy Load Factors in Chapter 4), the unit revenue for Atlantic and Pacific operations would be significantly higher than that of domestic markets with comparable stage length.

Therefore, it can be seen that when the effect of stage length is accounted for, international operations has a significantly higher revenue generation power per unit traffic, especially in Atlantic and Pacific operations. This is a strong driving force behind legacy carriers' aggressive shift to international operations that started after 2003.

A similar graph for the first quarter of 2006 is shown in Figure 5-4. This is a period where airlines have already undergone significant international shift. The distances of international yields from the domestic yield curve is even greater this time, which might indicate that the international yields when compared with domestic are even better than in 2003, implying an even stronger driving force to international shift in 2006. It seems that the aggressive international capacity expansion did not cannibalize their yields—there is simply higher demand for international service in 2006 compared with 2003, and that there is more fare competition in domestic markets from the LCCs, which kept the domestic RASM from reaching higher levels.

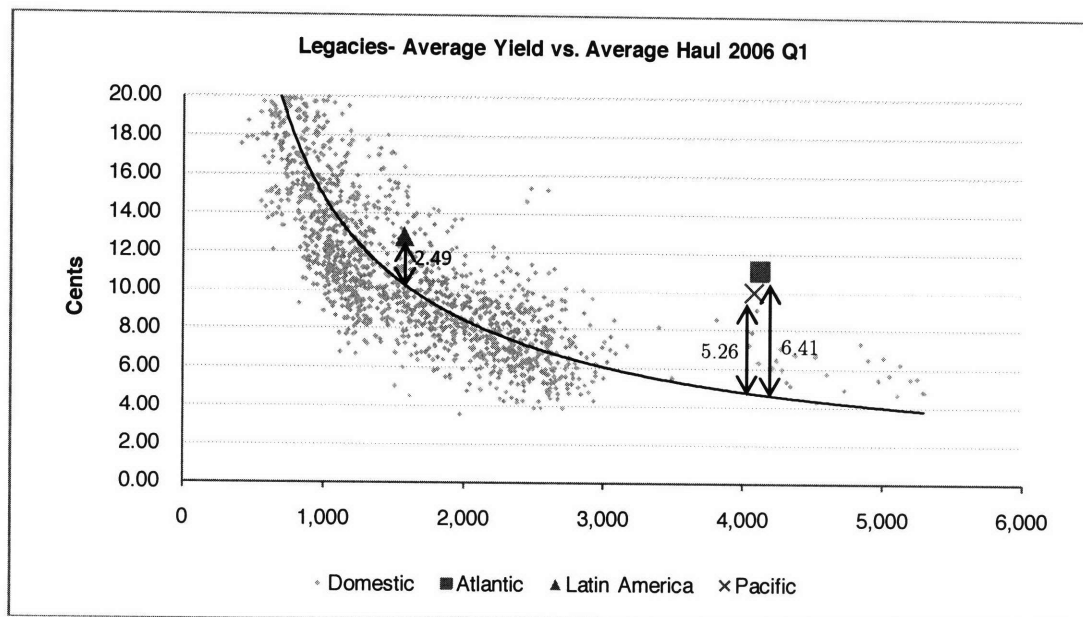


Figure 5-4: Legacies Yield vs. Average Haul in 2006 Q1

5.3 Profitability

5.3.1 Operating Profit Margin

US carriers report operating profit or loss for different entities individually based on the total operating cost and total operating revenue for each entity. Based on that, we obtain the profit margin for each region, which is shown in Figure 5-5 for 1995 to 2006. It can be observed that the operating profit margin for all regions plummeted from 2000 to 2002 during the economic downturn and climbed back up after that. Comparing between different entities, it seems that since around 2000, the profit margins for Atlantic and Latin American operations are clearly higher than that of domestic and Pacific operations.

For an easier comparison, the three international entities were grouped into one as shown in Figure 5-6. It can be seen from the figure that from 1995 to 2000, domestic profit margin is higher than that of international, while both entities were profitable. But this has reversed since 2001 when domestic profit margin dropped lower than that of international. In 2003, international operations barely broke even, while domestic loss margin was at 9%. This seems to explain the driving force behind international shift.

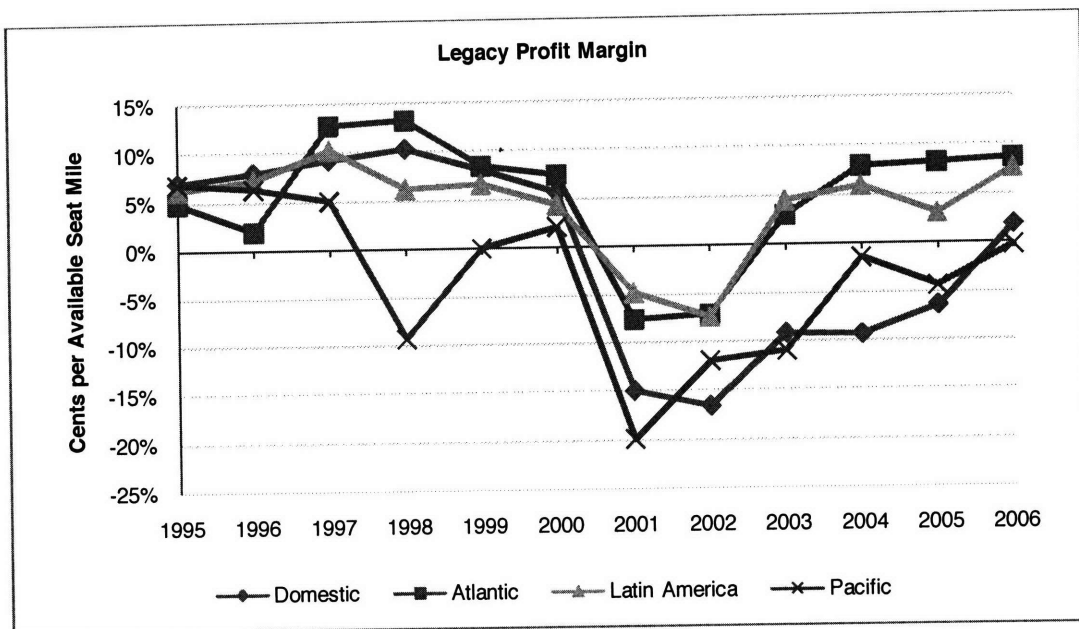


Figure 5-5: Legacy Profit Margin in Different Regions

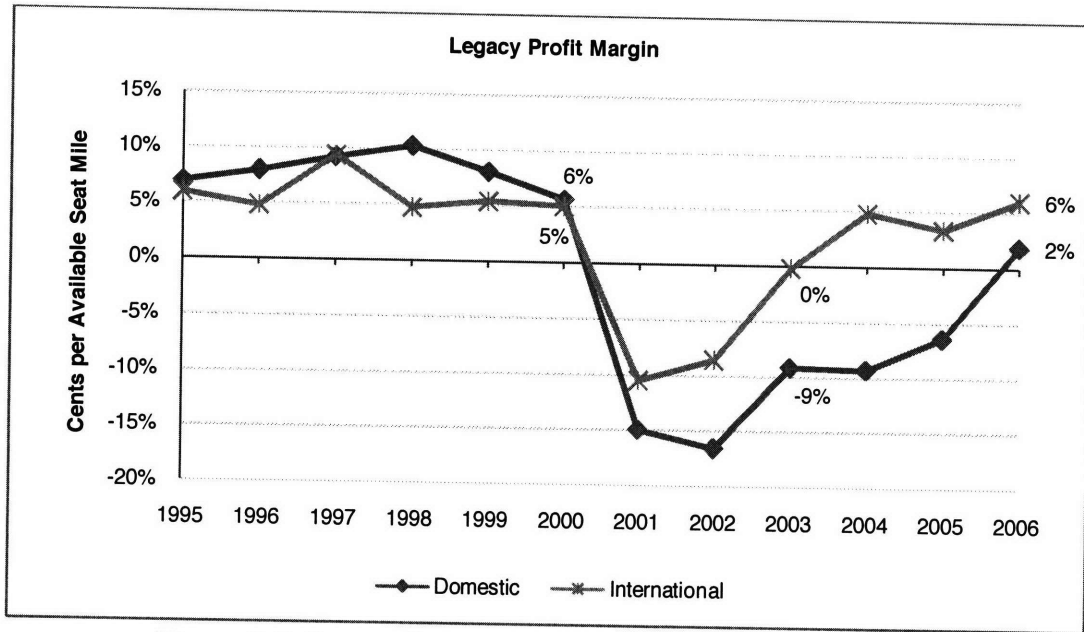


Figure 5-6: Legacy Profit Margin Domestic vs. International

Table 5-2: Legacy Profit Margin in Different Regions

	2000	2003	2006
Domestic	6%	-9%	2%
Atlantic	7%	3%	9%
Latin	4%	4%	8%
Pacific	2%	-11%	0%

Looking at profitability for each entity in 2000, 2003 and 2006 in Table 5-2, it can be seen that for all years shown, Pacific profit margin is lower than that of domestic operations. However, this does not necessarily mean Pacific operations are less profitable than the others, as the profit margin for each entity depends on the scheme of how the costs and revenues are allocated into each account, which might not always reflect reality. Therefore, more important in the study is to look at the change of profitability of each entity against each other.

5.3.2 Relative Change in Passenger Profitability

In the calculation of profit margin, the total operating revenue and total operating cost were utilized. But in analyzing the relative change in profitability, it is better to make use of Passenger RASM and CASM Ex Transport Related & Fuel that we have previously introduced. This is because total operating revenue also includes charter

revenue, transport related revenue and cargo revenue which might bias our results since we are focusing on passenger operations, while total operating cost includes transport related cost as well as fuel cost which can also distort the results as explained previously.

Table 5-3: Legacy RASM Gap and CASM (Ex Transport Related and Fuel) Gap

	2000	2003	2006	Δ 00 to 03	Δ 03 to 06
RASM Gap (Cents)	2.44	1.28	0.77	-1.16	-0.50
CASM Gap (Cents)	1.80	1.83	1.28	0.02	-0.55
Δ CASM Gap – Δ RASM Gap:				1.18	-0.05

Table 5-3 compares the RASM gaps with the CASM gaps (Ex Transport Related and Fuel Cost) presented in the previous chapter in order to piece the cost and revenue together to get a better picture of the relative profitability of the two operations. The reason why we look at the RASM and CASM gaps between domestic and international operations, instead of directly obtaining the profit per ASM (RASM – CASM) is because it is hard to come up with a good profitability figure here since both RASM and CASM here are not inclusive of all items. Transport Related cost and Fuel cost were excluded from the CASM in order to get a better comparison between the entities, while RASM here only takes into account passenger revenue, ignoring other constant sources of income such as cargo revenue and in-flight sales revenue. Thus we will focus on the evolution of profitability of the two groups *relative* to each other.

For a decrease in RASM gap, holding the CASM gap constant, it means that the international profitability has improved relative to domestic profitability, since it means that international RASM which is always lower than domestic RASM, has risen closer to domestic level. Vice versa happens to CASM, whereby a decrease in CASM gap, holding the RASM gap constant, means domestic profitability improved relative to international profitability.

As shown in the preceding table, RASM gap reduced by 1.16 cents in the period 2000 to 2003. At the same time CASM gap increased slightly by 0.02 cents, both figures shows favorable change of profitability to international operations. We can sum these two figures up by Δ CASM Gap – Δ RASM Gap = 1.18 cents. In other words, from 2000 to 2003, international operations became 1.18 cents more profitable per ASM relative to domestic operations, and observing this change is probably one incentive to for the

airlines to shift to more international flying after 2003. On the other hand, from 2003 to 2006, RASM gap and CASM gap reduced by 0.5 cents and 0.55 cents respectively, and combining the effects gives domestic operations a slight 0.05 cents favor in change of profitability relative to international operations. This reversal can well be a result of the airline's aggressive decrease in domestic capacity which leads to higher yields, and this might also mean that the push towards more international operations might be reduced as of 2006 compared with three years ago.

Note that though, the figures of Δ CASM Gap – Δ RASM Gap are not absolute comparisons between domestic and international operations, which means that we cannot tell from them which is more profitable. The only implication is the gain in relative advantage of international operations against domestic operations. Therefore inasmuch as we can say that “international operations became more profitable compared with domestic operations from 2000-2003”, we can conversely say that “international operations became less unprofitable compared with domestic operations from 2000-2003”.

5.4 Individual Carrier Comparisons

5.4.1 Overall RASM Comparison

In this subsection we will look at the carrier by carrier comparison of RASM evolution. Table 5-4 summarizes the domestic and international RASM for all six carriers in 2000, 2003 and 2006.

Table 5-4: Domestic and International RASM Table in Cents

Domestic RASM in Cents				International RASM in Cents			
	2000	2003	2006		2000	2003	2006
AA	10.44	8.65	10.23	AA	9.59	8.54	10.30
CO	10.63	9.05	10.41	CO	7.74	7.84	9.32
DL	10.27	8.71	9.66	DL	7.33	7.91	8.59
NW	10.44	9.74	11.44	NW	7.35	6.66	9.27
UA	10.41	8.23	9.96	UA	7.86	6.93	9.32
US+HP	10.75	9.18	10.20	US+HP	7.06	7.17	9.70

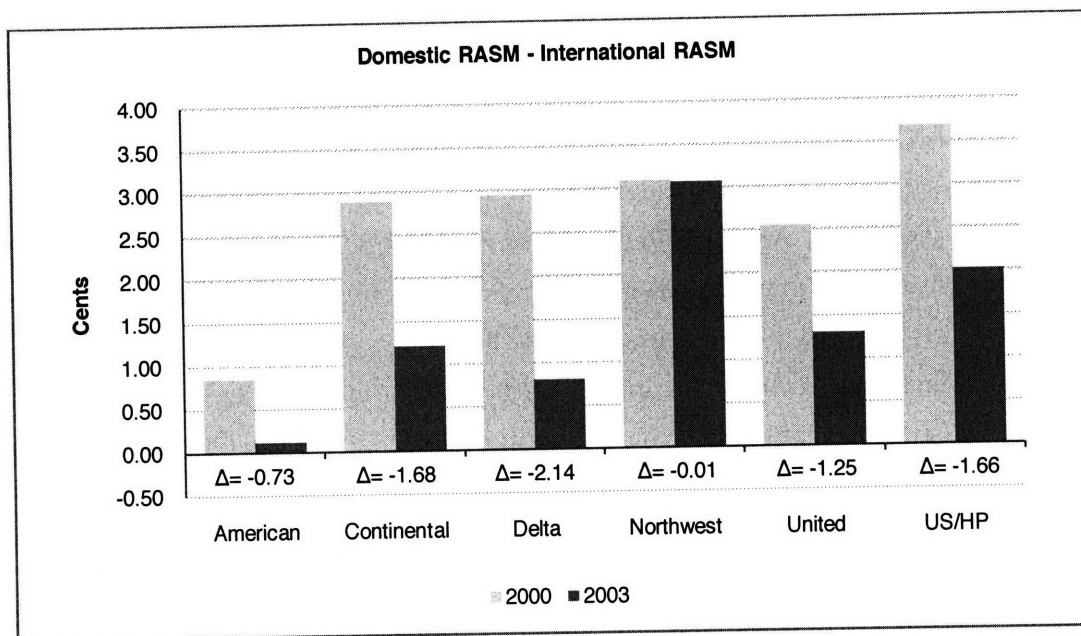


Figure 5-7: Difference between Domestic and International RASM 2000-2003

Figure 5-7 and Figure 5-8 depict the six legacy carriers' RASM gap, i.e. domestic RASM minus international RASM for 2000 vs. 2003 and for 2003 vs. 2006 respectively. Also indicated in the figures are the magnitudes of the change in RASM gaps for each airline in the said time period.

As shown in Figure 5-7, RASM gaps have dropped for all six carriers in the period from 2000 to 2003, with the largest drop being Delta's 2.14 cents, and the smallest drop being Northwest's 0.01 cents drop. A larger drop generally means that international unit revenue improved relative to domestic unit revenue, and thus it is of no surprise to observe that after 2003, Delta was the most aggressive in its international shift, with a 56% increase in international ASM from 2003 to 2006, while Northwest was the least aggressive, with only a 1% increase in international ASM from 2003 to 2006. Furthermore, it can also be observed that airlines with lower RASM gap in 2003, i.e. American Airlines, Continental Airlines and Delta Airlines, are the airlines which exhibited more international growth from 2003 to 2006, which is reasonable as a smaller gap means that their domestic unit revenue is not that strong relative to their international operations, which gives them more incentive to shift its focus away from domestic operations.

Figure 5-8 shows the RASM gaps for 2003 and 2006. For this period, almost all of the carriers showed a drop in the RASM gap again, apart from Delta which showed an

increase of 0.27 cents. This follows reasonably what the carriers had been doing in relation to their international shift. In general, a more aggressive shift should favor increase in RASM gap, since more supply international operations could pull down the fares, at the same time reduced domestic supply tends to cause fares to rise. In the current case, Northwest Airlines, United Airlines and US Airways/ America West are the carriers with least international capacity growth from 2003 to 2006 (1%, 18% and 11% respectively) and they do indeed show the larger drop in RASM gap than the other three carriers, namely American Airlines, Continental Airlines and Delta Airlines, which had an aggressive international capacity growth of 28%, 48% and 56% respectively from 2003 to 2006. In particular, Delta Airlines which was the most aggressive in its international growth from 2003 to 2006 was the only carrier that showed an increase in RASM gap in the said period.

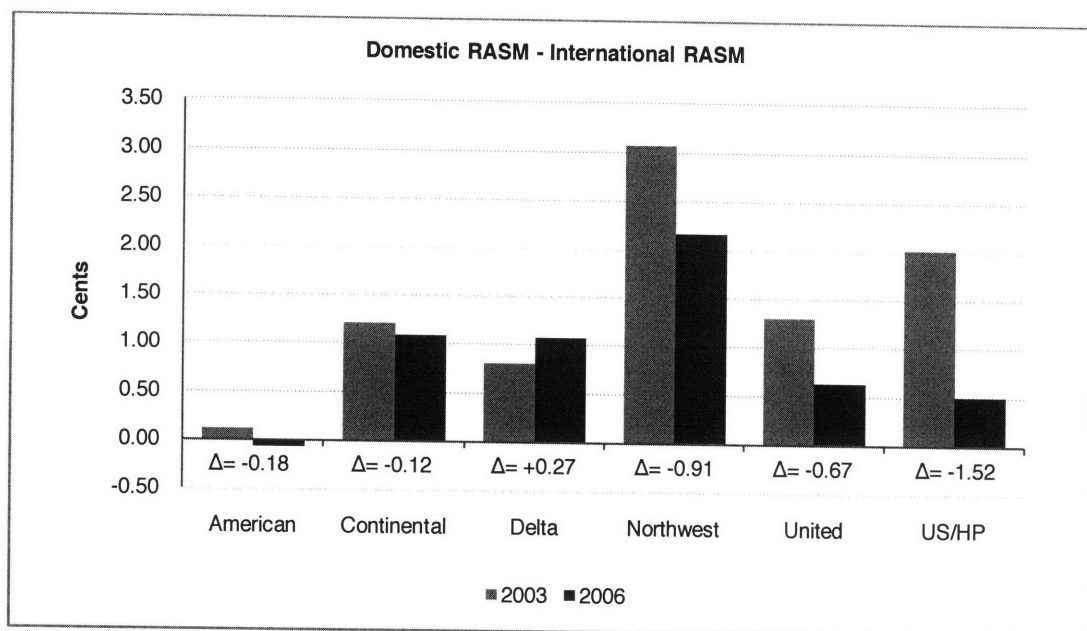


Figure 5-8: Difference between Domestic and International RASM 2003-2006

5.4.2 Overall Yield vs. Average Haul Comparison

In this subsection we will perform a carrier by carrier comparison of the detailed yield curve data. Similar average yield vs. average length of haul graphs were created for all six carriers. In all cases, the international yield points are all located above the fitted power law curve, and the distance of those points above the fitted curve for all six carriers in the first quarter of 2003 are summarized in Table 5-5.

Table 5-5: Distance of Average Yield above Domestic Yield Curve 2003 Q1 (cents)

	Atlantic	Latin	Pacific
AA	5.47	2.61	6.41
CO	4.18	0.12	5.88
DL	5.51	3.35	7.32
NW	4.12		2.88
UA	3.18	1.71	3.58
US+HP	2.24	2.07	

The increases in capacity to each international region from 2003 to 2006 for all six carriers are summarized in Table 5-6 below. It can be seen that in general, higher “yield premiums” above domestic yields in 2003 are associated with a greater increase in ASM from 2003 to 2006. For example, in Atlantic, the three carriers having the highest “yield premium” are the three carriers who have the highest capacity increase; Delta has one of the highest “yield premiums” for all regions, and it is also the carrier with the greatest increase in international capacity. Northwest has lower “yield premiums” than other carriers in 2003, and it had the most modest international growth among all legacies from 2003 to 2006.

Table 5-6: Legacies Change in International ASM from 2003 to 2006

	Atlantic	Latin	Pacific
AA	22%	23%	94%
CO	56%	29%	62%
DL	50%	86%	10%
NW	1%		1%
UA	4%	11%	30%
US+HP	1%	31%	

Table 5-7: Distance of Average Yield above Domestic Yield Curve 2006 Q1 (cents)

	Atlantic	Latin	Pacific
AA	7.54	3.50	6.89
CO	6.12	1.44	6.40
DL	5.83	2.70	7.12
NW	5.51		4.14
UA	6.35	1.45	5.40
US+HP	8.92	1.10	

Table 5-8: Change in International Yield Premium from 2003 Q1 to 2006 Q1 (cents)

	Atlantic	Latin	Pacific
AA	2.07	0.88	0.48
CO	1.94	1.31	0.52
DL	0.32	-0.65	-0.20
NW	1.39		1.26
UA	3.17	-0.26	1.82
US+HP	6.68	-0.96	

Table 5-7 shows the distance of each region's average yield above the domestic yield curve in the first quarter of 2006, while Table 5-8 summarizes the change of this magnitude from 2003 Q1 to 2006 Q1. It can be seen that even with the increase in capacity from 2003 to 2006, the "yield premium" for most of the carriers' region of operations still increased, probably indicating a strong backing of demand relative to domestic operations.

5.4.3 Overall Profitability Comparison

Table 5-9: Legacy Carriers Profit Margin

Domestic Profit Margin				International Profit Margin			
	2000	2003	2006		2000	2003	2006
AA	7%	-16%	1%	AA	8%	9%	8%
CO	5%	-5%	-6%	CO	10%	13%	20%
DL	11%	-9%	3%	DL	4%	-6%	-9%
NW	9%	-1%	8%	NW	0%	-6%	1%
UA	3%	-12%	2%	UA	5%	-11%	3%
US+HP	0%	-5%	3%	US+HP	-3%	3%	12%

Table 5-10: International Profit Margin minus Domestic Profit Margin

	2000	2003	2006
AA	1%	19%	18%
CO	5%	23%	35%
DL	-6%	-2%	-7%
NW	-9%	-8%	-6%
UA	2%	-5%	4%
US+HP	-2%	10%	22%

Table 5-9 summarizes the profit margin for domestic operations and international operations in 2000, 2003 and 2006 as reported by the carriers. Table 5-10 then summarizes how much higher the international profit margins are compared with the domestic profit margin. A positive number means international profit margin is better than that of domestic operations. It can be seen that for American Airlines and Continental Airlines which increased international capacity aggressively, international profit margin does appear a lot higher than domestic profit margin. Yet for Delta Airlines, the airline increased its international capacity share dramatically even though its domestic profit margin is higher than its international profit margin, indicating that profit margin might not be a good explanatory variable to the international shift.

Table 5-11: Change in Relative Profitability & Increase in International Capacity

	Δ CASM Gap – Δ RASM Gap		Δ International ASM
	2000 to 2003	2003 to 2006	2003 to 2006
AA	2.27	-1.50	28%
CO	1.75	0.05	48%
DL	1.65	0.64	56%
NW	0.46	0.31	1%
UA	-0.09	0.53	18%
US+HP	1.02	-0.26	11%

In view of that, we turn to the relative change of profitability to see whether it can explain the level of international expansion for different carriers better. Table 5-11 shows the Δ CASM Gap minus Δ RASM Gap for the six carriers from 2000 to 2003 and from 2003 to 2006, as well as the increase in international capacity from 2003 to 2006. The Δ CASM Gap minus Δ RASM Gap is an indication of the relative gain in advantage of international profitability compared with domestic profitability. It is apparent here that the three airlines which had the highest figure for 2000 to 2003, American Airlines, Continental Airlines and Delta Airlines, are the three carriers that underwent the most aggressive international growth after 2003.

5.4.4 American Airlines

American Airlines has the closest domestic and international RASM than all other carriers. The reason might be due to the closer average stage length between the two. In fact, from Figure 5-9 it can be seen that American's international RASM oftentimes

crosses above the domestic RASM. But whether it is just the stage length or whether American's international operations do have a strong revenue generating power, it is hard to judge from this graph, and a more in depth analysis of that will be presented in the next section.

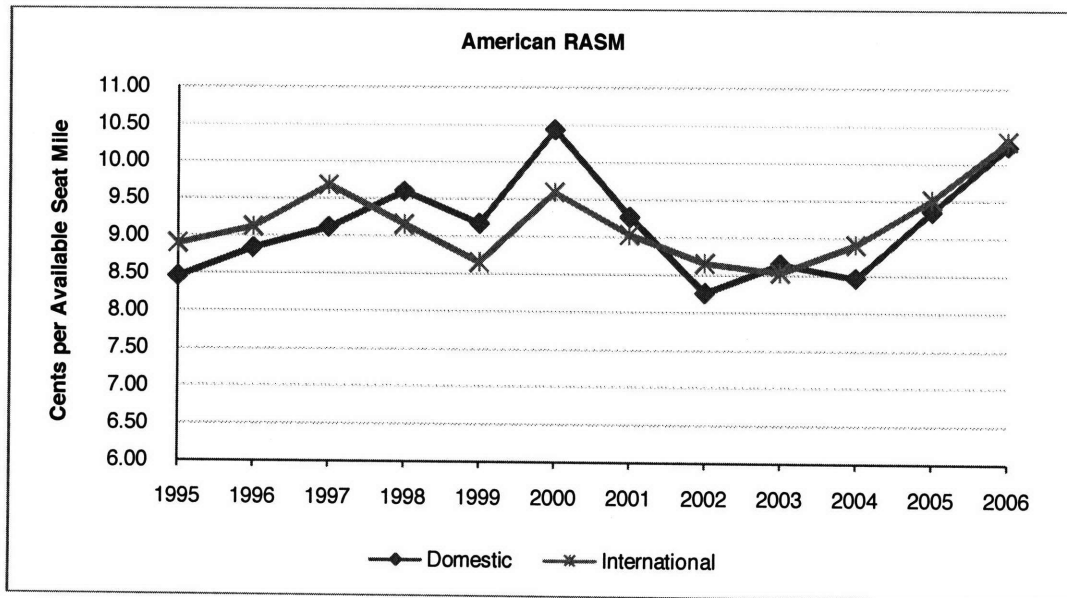


Figure 5-9: American Airlines RASM Domestic vs. International

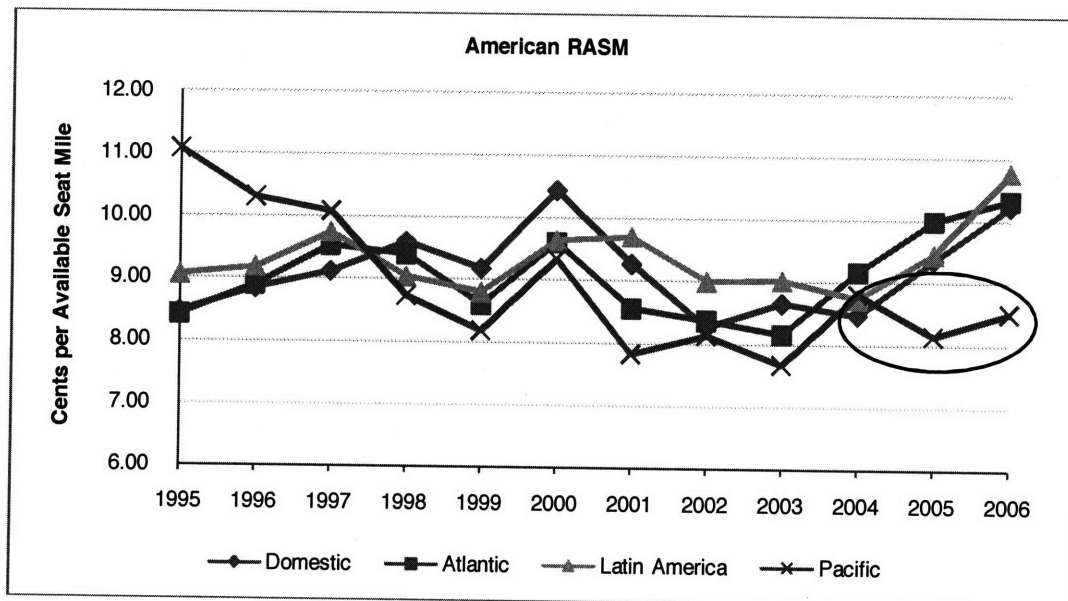


Figure 5-10: American Airlines RASM 1995 to 2006

Looking at a more detailed region by region comparison in Figure 5-10, one interesting observation to note is the relatively weak performance of Pacific RASM from 2003 to 2006. While domestic, Atlantic and Latin American RASMs increased by 18%, 26% and 19% respectively, Pacific RASM increased only by 9%. This might be attributed to the

American's disproportionally large Pacific expansion- with a 94% increase in capacity from 2003 to 2006 compared with the -4%, 22% and 23% for domestic, Atlantic and Latin American operations respectively, which dragged down Pacific's average fare by over supplying the market.

The international yield points for American Airlines in 2003 Q1 are among the furthest away from the domestic yield curve compared with other carriers, with a figure of 5.47 cents for Atlantic and 6.41 cents for Pacific, as shown in Figure 5-11. Although the fitted curve at longer hauls are lower than most of the data points there, even when measuring from the nearest real domestic market data point, the Atlantic and Pacific yields are still 3.3 cents and 4.92 cents above domestic. This is probably the reason why American had increased its international capacity so aggressively, especially for Pacific operations with a 94% growth from 2003 to 2006.

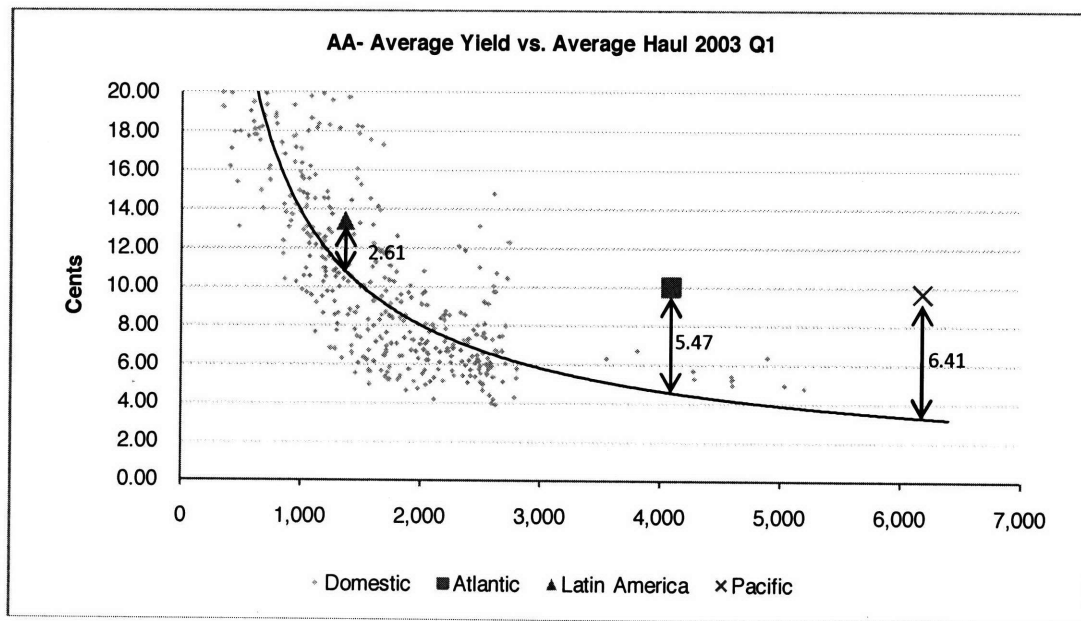


Figure 5-11: American Airlines Yield vs. Average Haul in 2003 Q1

5.4.5 Continental Airlines

Continental Airlines is one of the carriers that made the most aggressive move abroad. Figure 5-12 shows the strong convergence between domestic and international RASM from 2000 to 2003 of 1.68 cents, the highest among the six carriers. Among the three international regions, Latin American operations received the least expansion, with only

a 29% increase in capacity from 2003 to 2006 compared with 56% and 62% of Atlantic and Pacific respectively, despite the fact that from Figure 5-13 there can be seen a strong convergence between domestic and Latin American RASM from 1.88 cents to practically the same. However, a look at the yields with average length of haul taken into account will reveal that the revenue picture in Continental Airlines is actually not that outstanding compared with domestic, thus resulting in the lower expansion.

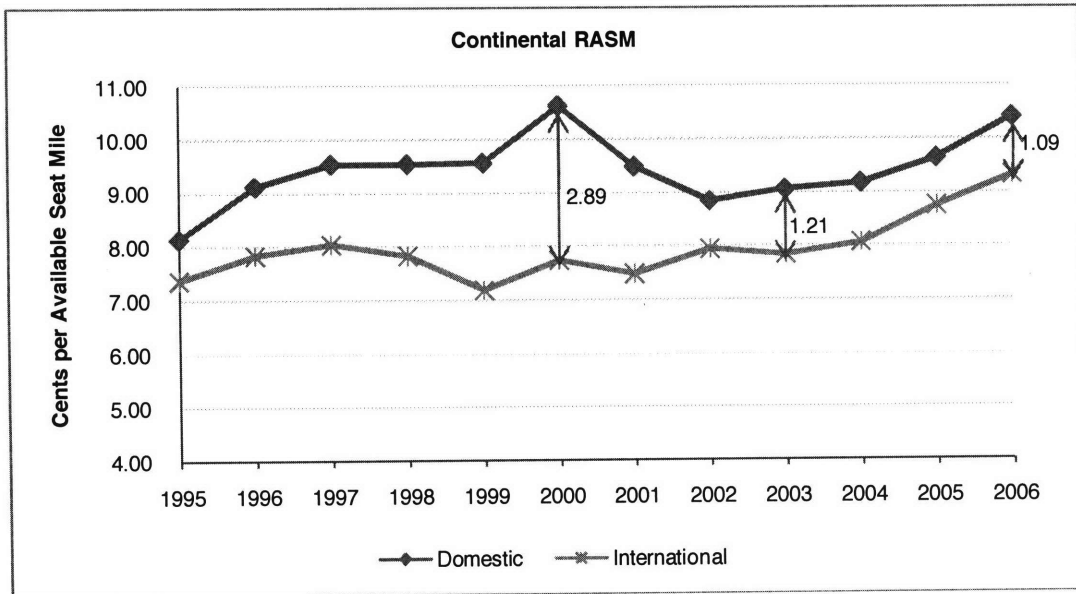


Figure 5-12: Continental Airlines RASM Domestic vs. International

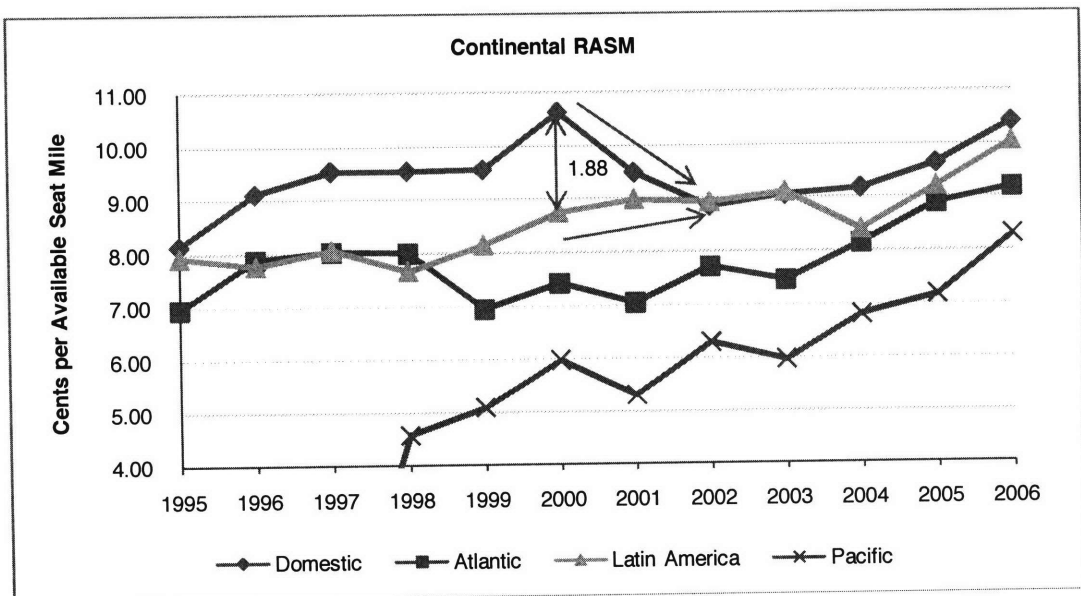


Figure 5-13: Continental Airlines RASM 1995 to 2006

Continental underwent a huge 48% international expansion from 2003 to 2006. But its Latin American expansion of 29% is much lower than that of Atlantic and Pacific, with 56% and 62% respectively. Figure 5-14 clearly shows one probable reason for that. In contrast to Atlantic and Pacific yields, Continental's Latin American yield is not much higher than that of domestic average in 2003 Q1, being only 0.12 cents above the fitted domestic yield curve, which, coupled with Latin America's lower Load Factor, makes it less desirable to expand into. On the other hand, Atlantic and Pacific yields for Continental is higher than the domestic Yield curve by a significant 4.18 cents and 5.88 cents respectively, which might be the reason behind the carrier's decision of stronger capacity growth in the two regions.

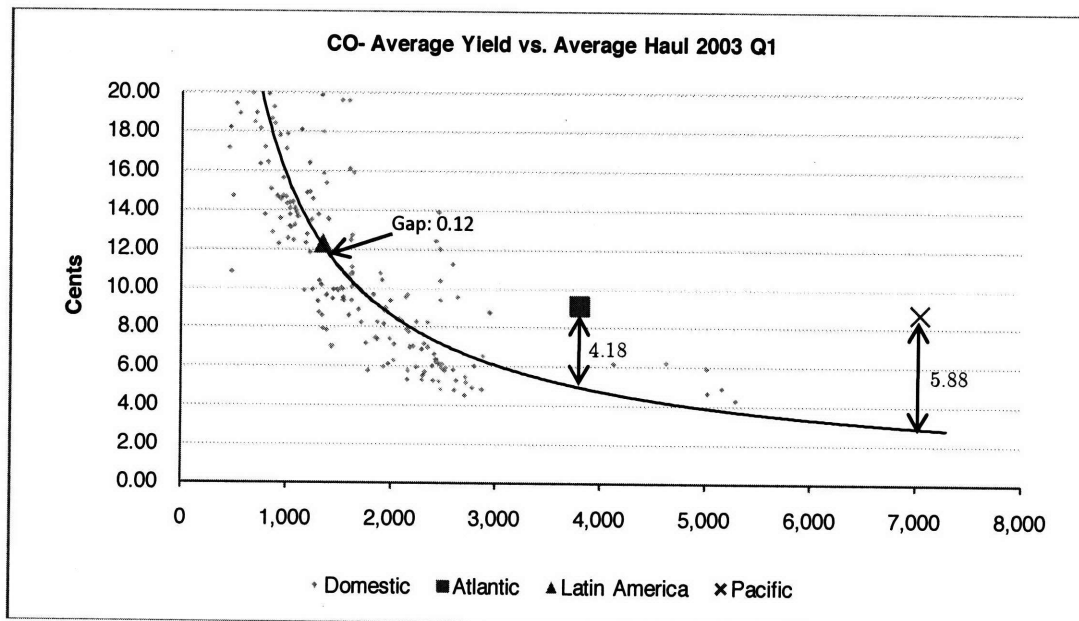


Figure 5-14: Continental Airlines Yield vs. Average Haul in 2003 Q1

5.4.6 Delta Airlines

Delta Airlines shows the strongest convergence of RASM out of all the legacy carriers, with the RASM gap reducing from its peak of 2.94 cents at 2000 to practically the same in 2005. Delta reduced its domestic capacity significantly by 16% from 2005 to 2006, and the result of that can be easily seen in Figure 5-15 where the RASM gap rebounded by around 1.07 cents in just on year.

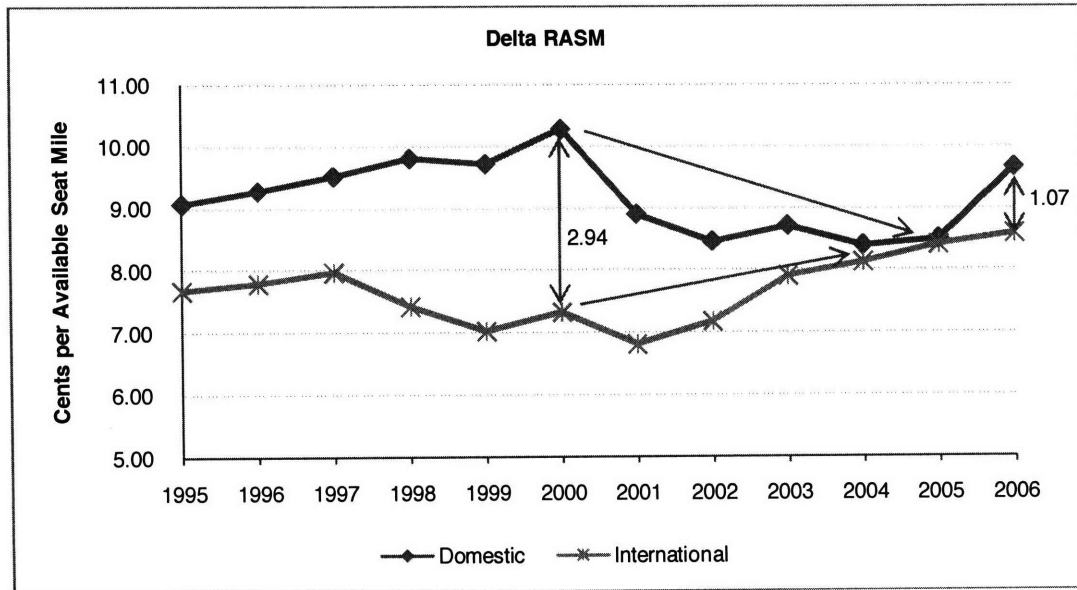


Figure 5-15: Delta Airlines RASM Domestic vs. International

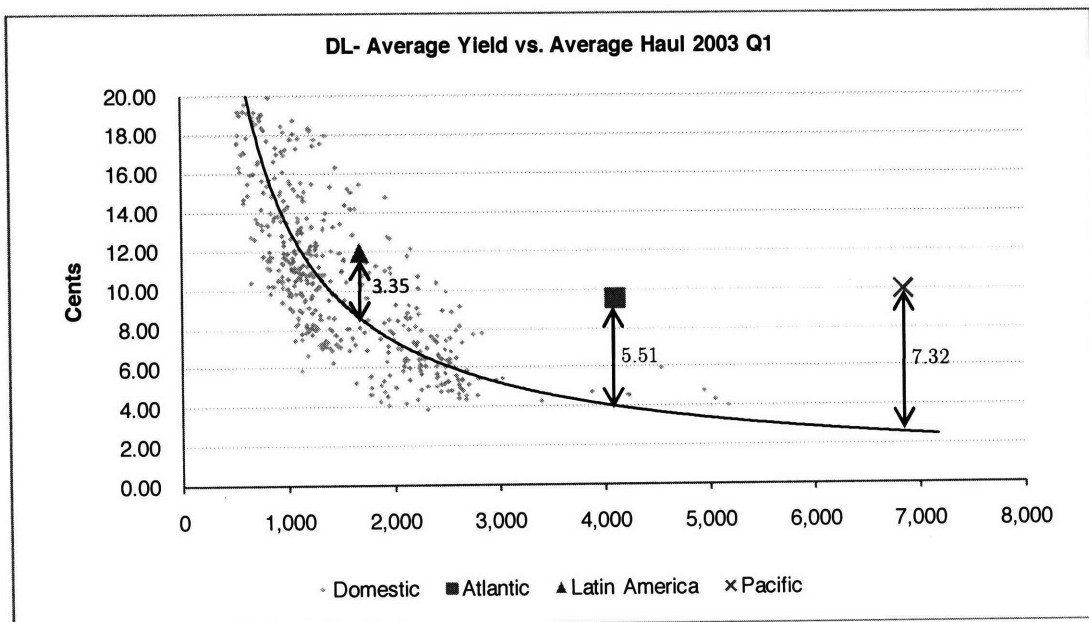


Figure 5-16: Delta Airlines Yield vs. Average Haul in 2003 Q1

Delta made the most aggressive international expansion from 2003 to 2006 out of all carriers with a 56% increase in international capacity, and it is apparent from Figure 5-16 the driving force behind the strategy. Delta's international yields are the furthest away from the domestic yield curve for all three regions out of the six carriers. On the other hand, despite Pacific's massive yield premium above the domestic curve, its capacity was only up by 10% in the period. This might be due to some strategic purpose for the company not to focus on Asia-Pacific market, because ever since the shut down of the Portland hub in 2002, only one Pacific route remained for Delta in the subsequent

years, the Tokyo route. However Delta has recently restarted a few Pacific routes, namely Seoul and Shanghai. Thus the Pacific capacity is set to grow significantly soon.

5.4.7 Northwest Airlines

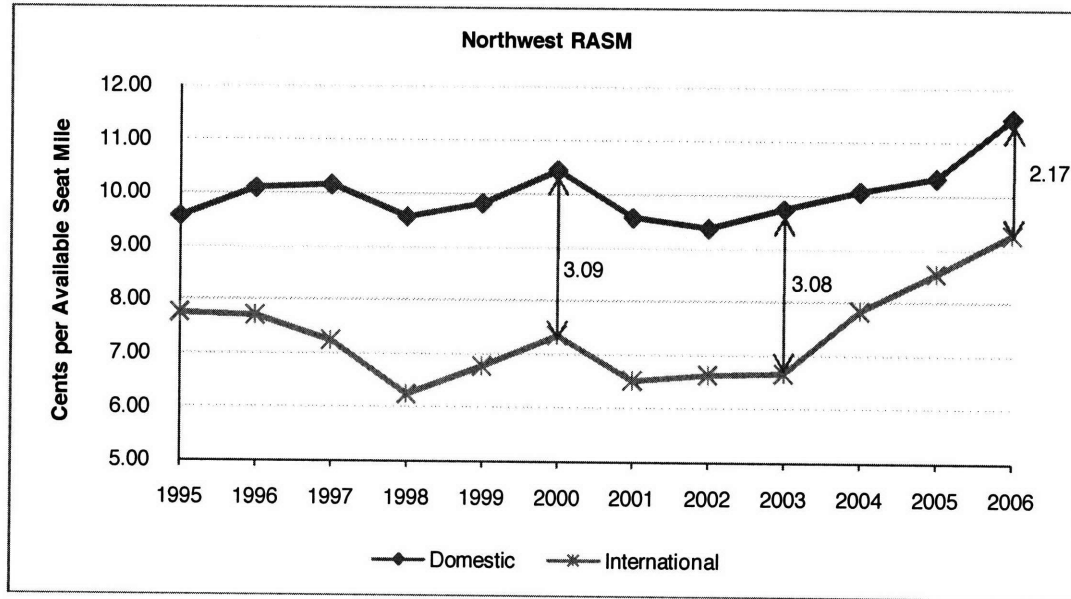


Figure 5-17: Northwest Airlines RASM Domestic vs. International

Northwest Airlines is the airline with the least amount of international expansion from 2003 to 2006, and it is not surprising when looking at its RASM trend in Figure 5-17, where it can be observed that the RASM gap between 2000 and 2003 did not change much at all. And perhaps because of its modest international capacity increase, the RASM gap became narrower by 0.91 cents from 2003 to 2006, the second highest convergence in that period, with the highest one belonging to US Airways/ America West, which also underwent one of the least international expansions.

Northwest is the carrier that made the least international expansion from 2003 to 2006, implying that Northwest's international yield premium is probably not very high. Indeed, from Figure 5-18, it can be seen that although the actual numbers of 2.88 cents for Pacific and 4.12 cents for Atlantic are nominally not that low, the domestic yield curve at the longer haul region is way down biased. In fact, if we look at the actual data points around the area, one can find domestic market yields at practically the same level as the international yields and, with even higher average haul. There is thus little motivation in 2003 for the airline to embark on international expansion.

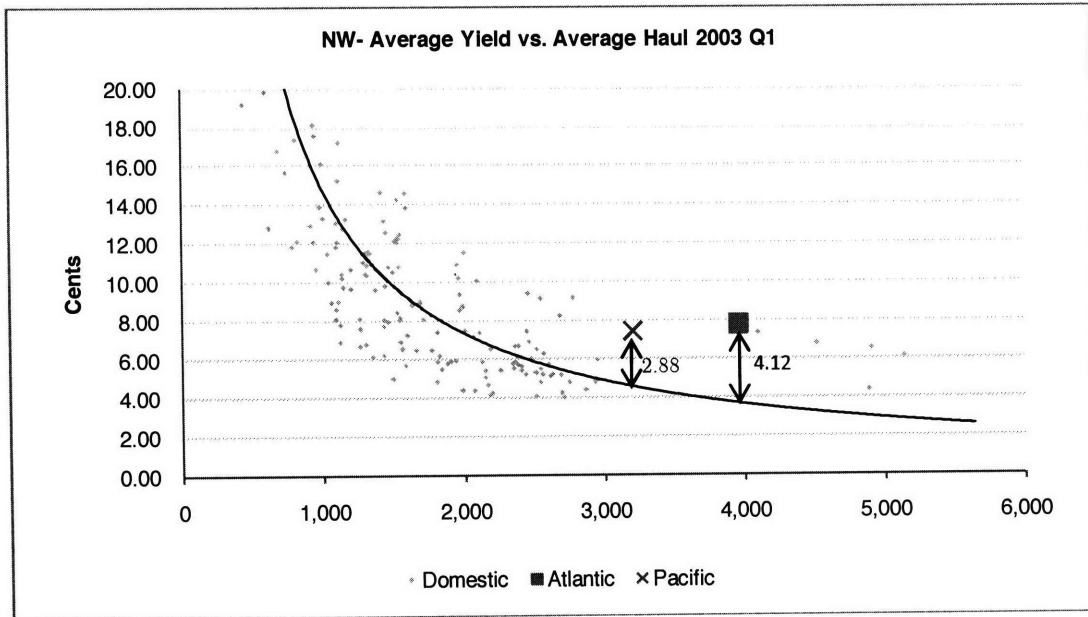


Figure 5-18: Northwest Airlines Yield vs. Average Haul in 2003 Q1

5.4.8 United Airlines

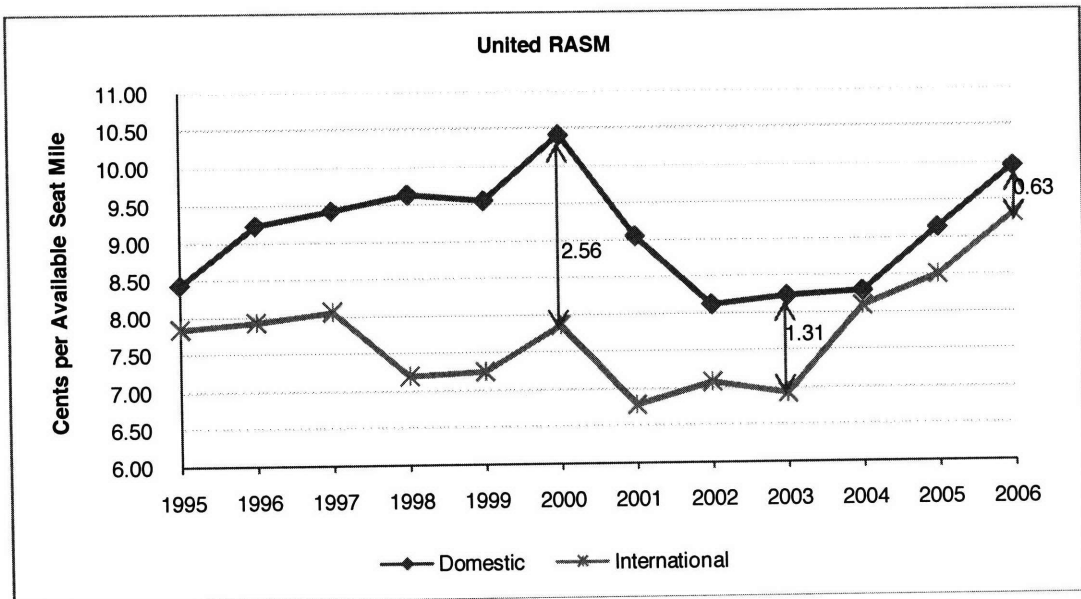


Figure 5-19: United Airlines RASM Domestic vs. International

As shown in Figure 5-19, United Airlines has one of the greatest convergence between domestic and international RASM from 2000 to 2003. However, its convergence between domestic and international CASM in the same period is even greater, making the international operations not as attractive. Thus United's international expansion from 2003 to 2006 is only around 18%, one of the lower figures out of all regions.

From Figure 5-20 it can be seen that United Airlines had among the lowest international yield premiums out of all six carriers- having the second lowest figure in all three regions. This might explain why United Airlines only had a modest 18% growth in its international capacity from 2003 to 2006.

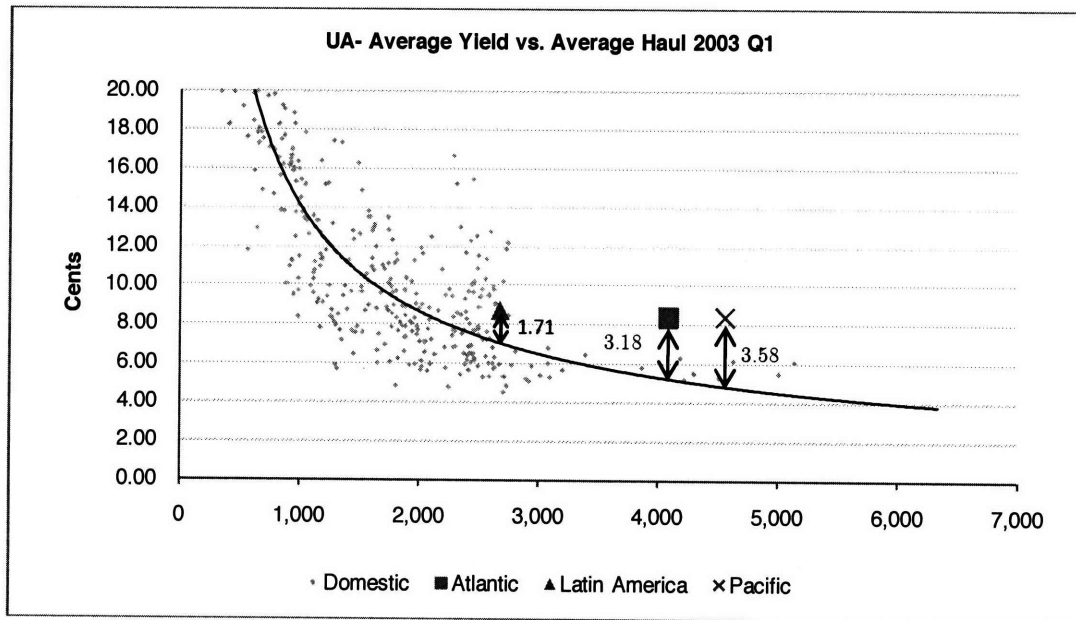


Figure 5-20: United Airlines Yield vs. Average Haul in 2003 Q1

5.4.9 US Airways + America West

US Airways & American West Airlines combined increased Latin American capacity by 31% from 2003 to 2006, while Atlantic capacity remained basically the same. Although no significance change in RASM between domestic and Latin American operations were observed between 2000 and 2003, from Figure 5-21 it can be seen that since 1999, Latin American RASM has already grown to domestic levels and stayed close ever since, while for the time being, Latin CASM Ex Trans Related and Fuel Cost was significantly lower than that of domestic operations. And looking back at Figure 3-36 in Chapter 4, it can be seen that the aggressive Latin American expansion has in fact started incidentally after 1999, right after the Latin American RASM reached domestic levels, where the ASMs increased by a massive 290% from 1999 to 2004,

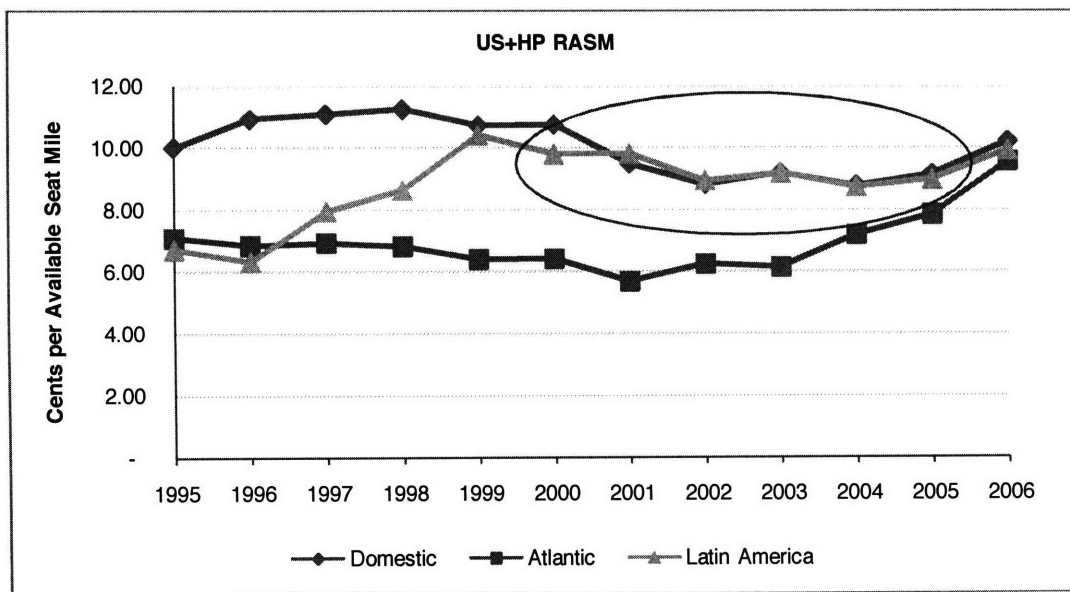


Figure 5-21: US+HP RASM trend from 1995 to 2006

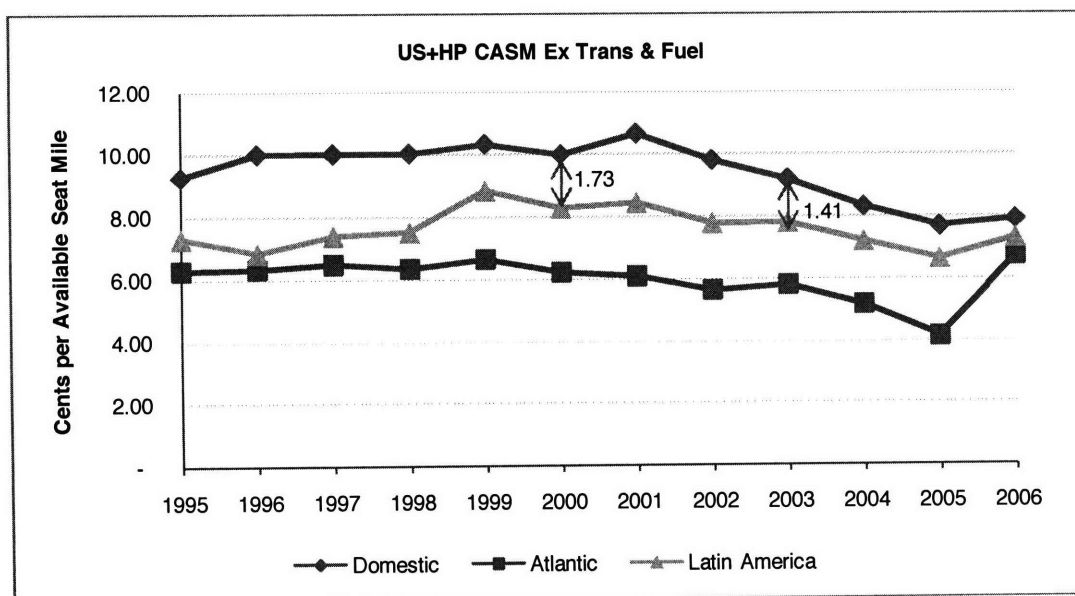


Figure 5-22: US+HP CASM Excluding Transport Related and Fuel Cost

US Airways & American West combined has the lowest Atlantic yield premium over domestic yield out of all the six carriers in 2003 Q1 as shown in Figure 5-23, which might explain why the carrier only had a 1% increase in Atlantic capacity from 2003 to 2006, basically staying the same just like Northwest. On the other hand, despite its not so outstanding Latin American yield premium of 2.07 cents (ranking the third highest), the carrier still underwent a 31% increase in Latin American capacity from 2003 to 2006. However, looking at the historic ASM evolution in Figure 3-36 of Chapter 4, it can be

seen that this increase is actually just the end of a massive Latin American capacity growth that started in 1999. In fact, the growth had already leveled out after 2004.

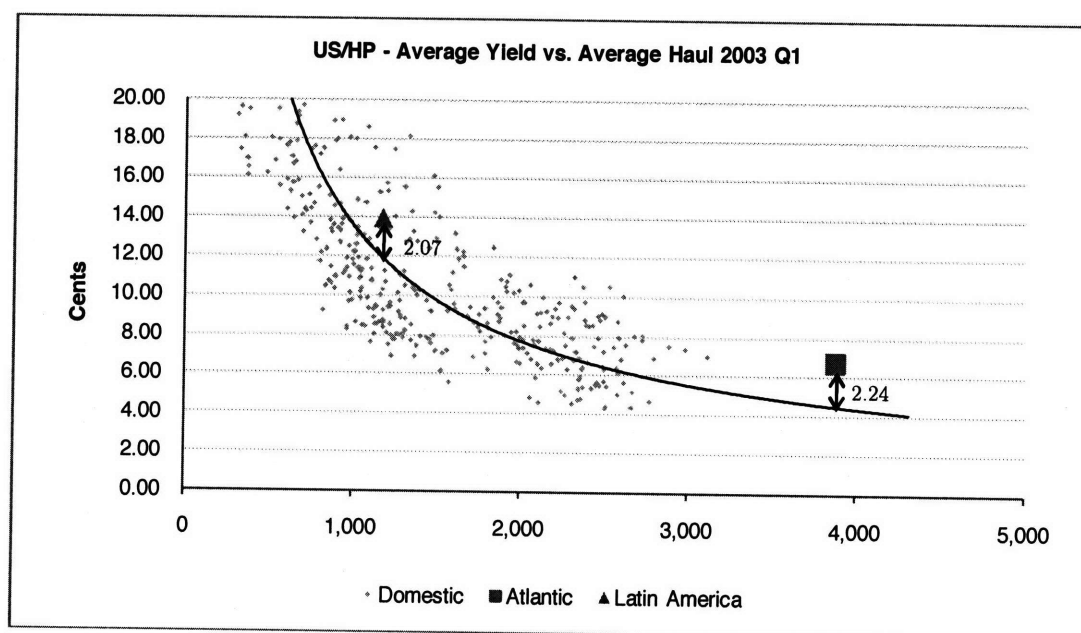


Figure 5-23: US+HP Yield vs. Average Haul in 2003 Q1

5.5 Chapter Summary

From 2000 to 2003, before the onset of legacy carriers' aggressive shift to international operations, international profit margin had rebounded to breakeven while domestic margin was still at -9%. Moreover, the RASM gap between legacy carriers' domestic and international operations converged, with international RASM approaching domestic RASM levels, while at the same time, Ex Transport Related & Fuel CASM gap between domestic and international operations remained roughly the same. The combined effect is that international operations had an advantage of 1.18 cents per ASM improvement in profitability relative to domestic operations from 2000 to 2003. This set the stage for legacy carriers' significant international capacity expansion that followed.

In general, airlines that showed a higher " Δ CASM Gap - Δ RASM Gap", i.e. greater relative improvement of international operation's profitability compared with domestic operations in 2000 to 2003, also underwent greater international expansion from 2003 to 2006.

When the effects of length of haul is accounted for, yield in international markets are in general significantly better than domestic markets, especially for Atlantic and Pacific markets, which explains the motivation for shifting operations from domestic to international. In general, airlines that have a higher international yield premium over domestic yields in 2003 tend to have a greater international capacity expansion from 2003 to 2006.

Chapter 6

Conclusions

In view of the recent trend for US legacy carriers to shift capacity from domestic operations to international operations, we have in this thesis quantified the level of this shift in detail and attempted to explain the driving force behind it in terms of costs, revenues and profitability using Form 41 and DB1B database from the US Department of Transportation. In this last chapter, a summary of findings is presented in Section 6.1, while a brief discussion of possible future research directions is provided in Section 6.2.

6.1 Summary of Findings

Significant International Shift

While domestic market share in the USA was increasingly taken up by the LCCs, whose capacity share increased from 9% in 1995 to around 25% in 2006, US legacy carriers started a significant shift of capacity from domestic operations to international operations after 2003. From 2003 to 2006, legacy carriers decreased their combined domestic capacity by 5% while at the same time increased their international capacity by 26%, and thus within a few years, their proportion of international capacity grew from 30% of total legacy system-wide capacity in 2003 to 36% in 2006, and this rate did not seem to be slowing down.

However, the rate of international expansion was highly variable for different carriers, with Delta being the most aggressive, having a 56% increase in international capacity between 2003 and 2006. Northwest was the least aggressive, increasing its international capacity by only 1% in the same period. Therefore in this study we tried to explain the reason behind this shift as well as the difference in strategy among different carriers by looking at the costs, revenues and profitability data of US legacy carriers.

Improved International Relative Profitability

To understand the motivation behind the shift that started after 2003, we focused on changes that occurred preceding 2003 since there must be a time lag between cause and effect, and the main time frame being chosen was the period between 2000 and 2003. We did find that the reported aggregate operating profitability for international operations became substantially higher than its domestic counterpart from 2000 to 2003, but when looking at carrier by carrier, reported profitability did not seem like an adequate explanatory variable. This is due to the fact that different airlines might have different cost and revenue allocation schemes among different entities, and that total operating profitability also takes into account items outside of passenger transportation.

We thus reverted to studying the changes in Ex Transport Related & Fuel CASM and the Passenger RASM, both of which isolate the mainline passenger business and provide a fairer comparison among airlines. While changes in unit costs (Ex Transport Related & Fuel CASM) alone could not explain the shift to international operations, when combined with the unit passenger revenue (RASM), the reasons behind the shift became clear. We looked at how international and domestic RASM and CASM (Ex Transport Related & Fuel) has changed relative to each other, and found that from 2000 to 2003, the RASM gap between legacy carriers' domestic and international operations converged, with the international RASM approaching the higher domestic levels, while at the same time the Ex Transport Related & Fuel CASM gap between domestic and international operations remained roughly the same. The combined effect was that international operations had a 1.18 cents per ASM improvement in profitability relative to domestic operations within this period. The relative changes in profitability as calculated from the Ex Transport Related & Fuel CASM and Passenger RASM also helped explain the different strategies adopted by different carriers, with carriers that showed a higher

“ Δ CASM Gap – Δ RASM Gap” between 2000 and 2003 also having greater international expansion from 2003 to 2006 in general.

Better International Yields

In addition to a favorable relative change in profitability when compared with domestic operations, yields for international operations, when adjusted for stage length, were also found to be stronger than for domestic markets in 2003. The yields for international operations were significantly higher than those of domestic operations with similar stage length. This international yield premium was even more exaggerated in 2006, implying that strong international demand might have outpaced the already fast international expansion, and that further aggressive international expansion might follow. A better international yield premium was also found to be a good explanatory variable for the carriers’ different level of international expansion, with those carriers having a higher international yield premium over domestic yields in 2003 also tending to have greater international capacity expansion from 2003 to 2006 in general.

To conclude, it was the improvement in relative profitability when compared with domestic operations, combined with the relatively stronger international yields that favored US legacy carriers’ aggressive shift to international operations from 2003 to 2006.

6.2 Future Research Directions

From the analysis it can be inferred that US legacy carriers’ shift from domestic to international capacity might well continue for some time after 2006. But when will this trend halt? There will be a point when international markets get saturated as well, just like what has happened in the domestic arena. And no matter how far the international operations can expand, there still needs to be a substantial domestic network to feed the international traffic. The airline industry is after all a network business, and not all passengers originate from gateway cities.

As carriers pour capacity into international markets, the economics of those markets are bound to see changes as well. RASM growth will probably slow down as more competition arises, and with long haul LCCs starting to appear in some parts of the

world facilitated by new aircraft technology, the sustainability of high yields in long haul international markets might soon be under scrutiny. In addition to that, the new US-EU open skies agreement adds another dimension to the complexity. How will this impact the airline business? These are all intriguing questions that can be addressed in the future.

Moreover, there are also concerns of low service quality of US carriers when compared with foreign carriers. What is the implication of that in terms of economics and competitive landscape between US carriers and foreign carriers in international markets? Although DB1B database for foreign carriers are restricted for publication, there still exist useful data in the T-100 from the US Department of Transportation that might be able to yield some interesting comparisons that were not covered in this study.

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